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Aluminum Industry in the United States.

At the recent meeting of the American Institute of Mining Engineers, Prof. Joseph W. Richards, of Lehigh University, author of "Aluminum, its History, Occurrence, Properties, Metallurgy and Applications," delivered an unscheduled lecture on the present state of the aluminum industry and metallurgy in this country.

The metallurgy of aluminum reverses the procedure by which all other commercial metals are obtained, for the reason that it is more difficultly reducible from its oxide than are the other metals, silicon, iron and titanium, associated with it in bauxite, as yet, its only available ore. It is obvious then, that any reduction treatment of crude bauxite that will yield aluminum will also reduce the contaminating metals and these will destroy all the valuable qualities of the aluminum. Up to this time, no process has proved capable of removing these objectionable impurities from metallic aluminum. The procedure therefore is to purify the crude bauxite and then to reduce the refined alumina to metal.

The experiments of Charles M. Hall and his later efforts to apply his discoveries to the production of aluminum on a commercial scale form a topic of absorbing interest, and may be briefly outlined. His earliest attempts, at Oberlin College, Ohio, convinced him that electrolysis from aqueous solution was out of the question, because the nascent aluminum at the cathode was instantly oxidized. This suggested the use of organic salts devoid of oxygen as solvents, but without success. More recent experimenters, however, have proved the suitability of methyl bromide for this purpose, and have deposited aluminum from solution of aluminum bromide in this solvent. Turning then to the easily fusible halogen salts of aluminum, as solvents of alumina, from which electrolysis would reduce the metal, Mr. Hall found that fused cryolite, the double fluoride of aluminum and sodium, would dissolve the oxide. At a temperature of 850 deg. C., fused cryolite will dissolve 20 to 25 per cent. of its weight of alumina, the solution taking place as quietly and effectually as that of sugar in water. The electrolysis is then a comparatively easy matter.

In the meantime, Heroult, of France, had developed the same idea, but the United States Patent Office overruled his claim to a patent in this country and Hall's patents were secured.

Hall then spent three years at the Cowles plant at Lockport, N. Y., in an unsuccessful attempt to commercialize his processes. With the Pittsburgh Reduction Company he was more successful, and in 1889 began to turn out 50 lb. of aluminum per day; from this modest beginning, the output has advanced by giant strides. This company now holds the absolute monopoly of the aluminum-making industry in this country.

Electric power is the chief item of expense in aluminum reduction. In order to attract a desirable customer, the Niagara Power Company, which had just completed its first installation at Niagara Falls, agreed to supply the Pittsburgh Reduction Company with a low-tension, direct current, for approximately $18 per horse-power per year, and to stand the expense of transformers to provide such power from its regular high-tension, alternating current. The requirements of the Pittsburgh Reduction Company's upper works have grown from 1800 to 4000 h.p., and of the lower works from 3000 to 10,000 h.p., and arrangements are now completed for 17,000 h.p. more. At Shawinigan Falls, Quebec, the same company is now utilizing 5000 h.p., and at Massena, N. Y., 2000 h.p., with the option of enlarging its consumption at the latter place to 20,000 h.p. At New Kensington, near Pittsburg, Pa., the Pittsburgh Reduction Company operates a rolling and stamping mill for making aluminum sheets, rods, wire, tubes and utensils, and employs 450 men. Its annual output of aluminum from all its reduction works, is about equal to that of the rest of the world combined.

A process for purifying bauxite is also one of Hall's inventions. It consists in treating the impure bauxite, mixed with a proper amount of carbon, in an electric furnace, whereby the more easily reducible iron, silicon and titanium are extracted, leaving the alumina. The furnace is circular, with its walls formed of mixed carbon and bauxite enclosed between two concentric annular sheets. The bottom is a block of carbon. Carbon rods project downward into the top and can travel up or down. These carbons and the carbon bottom form the electrodes of the furnace.

The crude bauxite is first calcined in an ordinary furnace to expel water and some oxygen. It is then mixed with a little more than the amount of carbon necessary to reduce the impurities, and fed slowly into the top of the furnace, in among the carbon rods which at the beginning of operations are lowered nearly to the carbon bottom. An alternating, 1000-kw., current, at 2200 volts, is transformed to between 30 and 75 volts, capable of giving a secondary current of 33,500 amperes. The impurities (iron first, then silicon and finally titanium) are reduced and fuse into an alloy which sinks to the bottom; at the usual working temperature, 3000 to 3500 deg. C., a little aluminum also is reduced, while the purified bauxite contains a small amount of aluminum sub-oxide. As the melt accumulates, the carbon rods are withdrawn so as to leave but a short gap above its surface, and the bauxite mixture is added continuously until the furnace is full of the fused mass. The excessive heat of the fusion, makes it impossible to tap the furnace; then, too, if the fused alumina were cooled quickly, it would form densely hard artificial corundum, unsuitable for aluminum reduction. The entire furnace is therefore carried outdoors and its 15 tons of contents allowed to cool slowly. When cold, the alumina is found crystalized into an easily granulated saccharoidal mass, of a lilac color.

The earliest analysis of this material showed no iron or silicon, a trace of titanium and over 100 per cent. of alumina. The alumina having been weighed as Al_2O_3, this result suggested the presence of a lower oxide, possibly Al_3O_4, which was confirmed by microscopic study. The substance was then found to consist of a groundmass of Al_3O_4, constituting 8 to 10 per cent. of the whole, enclosing minute crystals of Al_2O_3, which the goniometer showed to have the characteristic angles of corundum. No metallic aluminum is present. This granular alumina is even more suitable for reduction than real Al_2O_3, since its weight en-

ables it to be handled and dissolved more easily than the light amorphous powder.

The aluminum reduction furnace is a heavy cast-iron trough, lined with carbon and having a depression for holding the bath. It is blocked up from the floor so as to permit cooling ventilation. A group of 48 carbon rods, each 3 in. diameter and 15 in. long, projects down into the depression and forms the anode, the lining of the cast-iron trough itself being the cathode.

In operation the trough is nearly filled with a fused bath of cryolite and a little aluminum fluoride, heated to a cherry red, at 850 to 900 deg. C. On the bath floats a thin layer of broken pieces of carbon. On this the refined alumina is scattered to dry and warm, and is made to fall through into the bath from time to time by stirring the floating layer. The carbon anodes project nearly to the bottom of the trough. Each carbon takes 200 amperes, equivalent to 30 amperes per sq. inch of trough surface, or 10,000 amperes for one furnace. Electrolysis absorbs 2.2 volts and resistance, 3 to 3.5 volts; the total electromotive force required is about 5.5 volts.

The melted aluminum collects in the bottom of the furnace and is tapped off at the side through a conical hole. This is closed by a plug of carbon and pitch, inserted on the end of a pointed bar. The yield from such a furnace amounts to about 1.75 lb. per horse-power day. It is essential to keep the bath heated to its working temperature, since, by cooling, the relative densities of the aluminum and the bath are reversed, as is shown by the following comparison of specific gravities:

	Cold.	Hot.
Bath	2.9	2.3
Aluminum	2.6	2.5

If cooling occurs, the aluminum tends to rise above the bath and short circuits the current. The same thing will occur if alumina is fed in too rapidly.

New Currency in China.

Colonel Haynes, of Nanking, sends a report on the new and uniform currency regulations adopted by China. The Government has decided to adhere to the silver standard, and ordered the coinage of an entirely new coin, the Kuping tael, which, with its subdivisions, is to be the only legal tender in China, superseding sycee and dollars alike.

The regulations begin by stating that the equality and weight of the new tael coin must be purer and more exact than those of the silver dollars minted in the provinces, so as to make it a true standard of the national currency. The best quality of sycee which is now in circulation is found to consist of 98.9 per cent. of pure silver.

Allowing 2 or 3 candareens for loss in minting, the new tael coin is to be minted with an alloy of 9 mace 6 candareens pure silver and 1 mace copper, as equal to 1 Kuping tael of full touch; 5-mace coins to be made of 4 mace 8 candareens pure silver and 5 candareens copper; 2-mace coins of 1 mace 7 candareens pure silver and 3 candareens copper, and 1-mace coins of 8.5 candareens pure silver and 1 5 candareens copper. The proportion of the output each time is to be 40 per cent. of 1-tael coins, and 20 per cent. each of the three subsidiary coins.

by discharging 2,000 gal. of water per min. from the mines by a duplex compound condensing steam pump instead of by compressed air.

C. E. Watts stated at a recent meeting of the Engineers' Society of Western Pennsylvania, reported in the *Engineering Record* (Feb. 17, 1906; p. 173) that still further economies would result from the substitution of other equipment more economical than that now in use, particularly in the electric generating line.

FIG. 4. MITTERBERG COPPER MINE.
Ore dressing plant at foot of upper incline.

Economy of Fuel at Mines.

At the Eureka mines of the Berwind-White Mining Co., where about 3,000,000 tons of soft coal are produced annually entirely by mechanical means, the fuel consumption with substantially the same outputs were decreased from about 8,400 tons to about 7,300 tons annually, by replacing five 1,500-ft. straight-line compressors by three compound steam Corliss compressors of 3,000-ft. capacity each. and

During the development of these collieries machinery was installed which was known to be reliable, but the idea of economy of energy production was on the obscure horizon. In 1903-4, after the desired coal production had been obtained, it was found that the amount of generated energy would soon be insufficient to maintain the production as the mine workings drew further away from the power stations, and for this reason more economical power equipment became desirable.

The Mitterberg Copper Mine in Austrian Tyrol.

BY EDWARD WALKER.

For many years the Mitterberg Copper mines in the Austrian Tyrol have been worked in a quiet way locally, the output being about 600 tons of copper a year. The chief owners were two gentlemen of Innsbruck, who on account of advancing age sold out recently, through an Austrian friend living in London, to an English Company. This company, which is strongly backed by names known in the metal world, such as Merton, Turnbull, Elkington and Oppenheim, intends to spend a large sum of money on a modern smeltery and dressing plant, and to considerably increase the output. Some particulars of the mine will therefore be of interest to readers of the JOURNAL.

The mines are situated in the Mitterberg Alps about fifteen miles from Bischofshofen, a station on the Austrian State railway between Salzburg and Innsbruck. The lodes outcrop about 5500 ft. above sea level, and the surrounding mountains rise to 8000 ft. A good idea of the country can be obtained from the accompanying view (see Fig. 4). The other illustrations show a map of the district, a diagrammatic section of the geological and topographical formation, and a section of the mine workings, respectively.

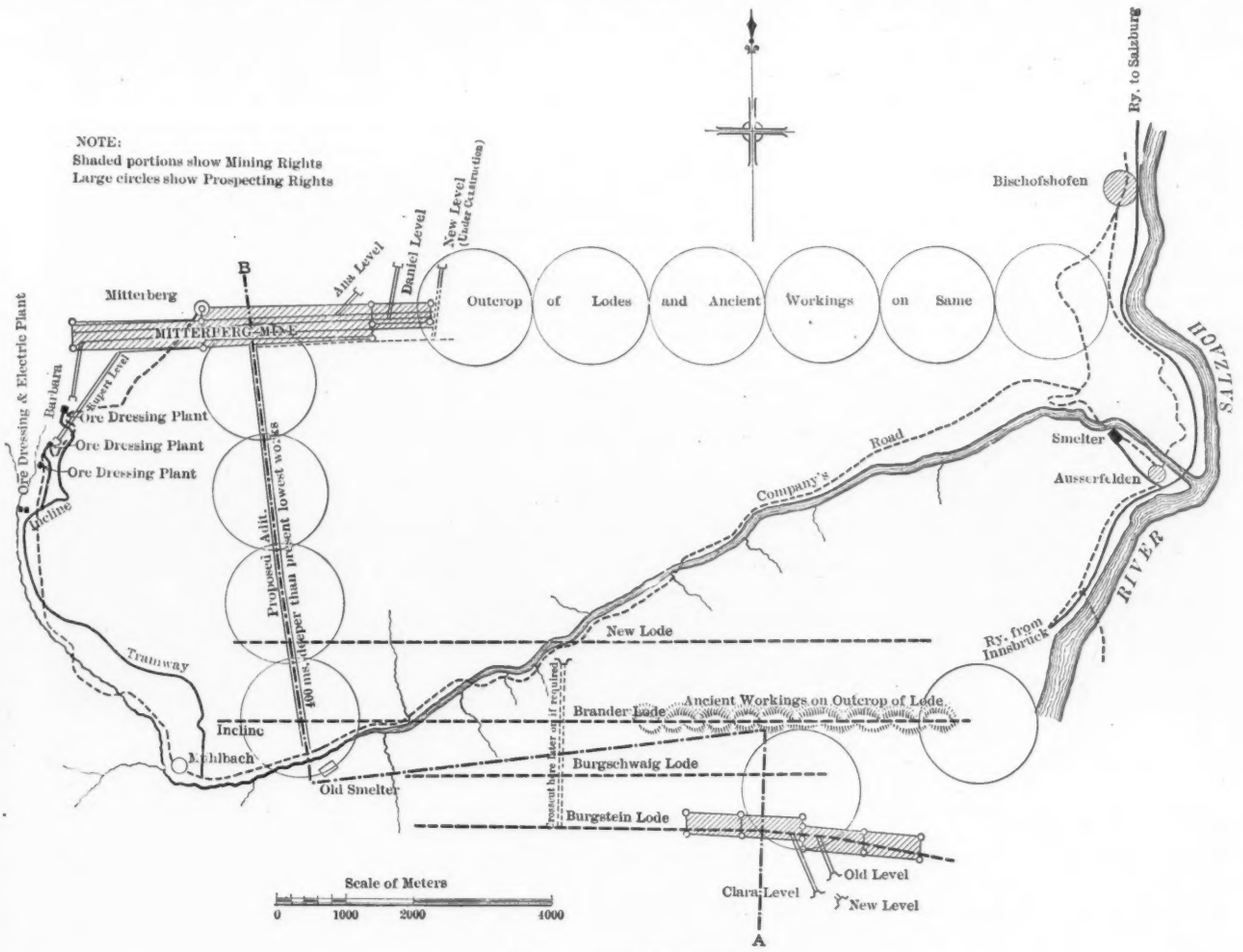


FIG. 1. MAP OF MINES.

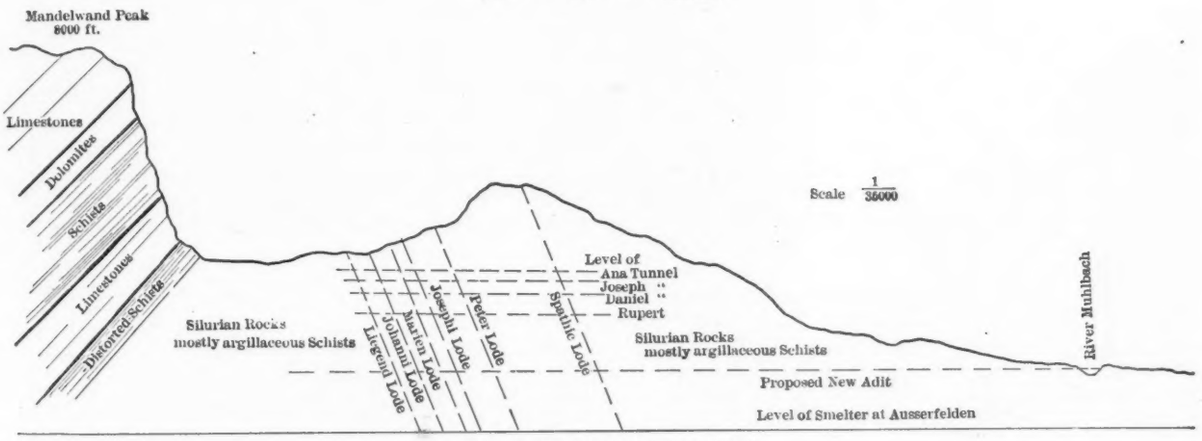


FIG. 2. GEOLOGICAL FORMATION.

In Fig. 1 the property of the company at Mitterberg is shown in the shaded rectangles. The circles show the prospecting rights belonging to the company. The company also owns mines and prospecting rights on the Burgstein lode shown in

the maps; but as these are comparatively undeveloped and their value unknown, it is unnecessary to deal with them here. At Mitterberg three parallel lodes have been worked, the Josephi, the Marien, and the Johanni; and four separate levels have been opened up, viz., the Ana, the Daniel, the Barbara, and the Rupert. In Fig. 3, the shading shows how much ore has been extracted, and how much is ore blocked out, probable ore, and possible ore.

The whole district is extensively mineralized. The rocks, as shown in Fig. 2, consist chiefly of argillaceous Silurian schists; and there are limestones and dolomites higher up the mountain. The lodes consist chiefly of quartz, but contain also some dolerite, calc spar, and spathic iron ore.

The copper ore is always chalcopyrite, interspersed to a very small extent with pyrite, nickel and arsenical pyrite; there are only traces of gold and silver. The ore filling occurs chiefly in compact stringers in the lodes, varying from 1 to 30 in. wide; but the remainder of the lode contains sufficient ore to make it worth extracting. In the three parallel lodes, the rich ore is not found in more than one lode at a time. When a rich shoot shows signs of diminishing in the Josephi lode, rich ore begins to be found in the Marien; and when this disappears, another is found in the Johanni.

The present method of treating the ore is to sort it by hand into shipping and concentrating ore. At the mouth of each of the upper levels is a concentrating plant, The ore coming from the lowest, or Rupert, level is hoisted up, by the plant for the purpose, to the level above for treatment. The concentrating plant is very complete and effective; and the extraction is excellent in spite of the nature of the ore. It is probable, however, that the expense of concentration is greater than is warranted, and that the new owners will devise some system whereby a slightly smaller recovery will be effected at a much reduced cost.

The picked and concentrated ore is sent by train roads down the hill, and from Muhlbach it is carried by road to the smelter at Ausserfelden, which is about 1½ mile from Bischofshofen. The method of smelting is very old fashioned and the new owners are about to build water-jacket furnaces and converters.

So far only a small portion of the outcrop has been exploited. The veins are easily traced all the way along the circles to near Ausserfelden. Exploratory work also leads to the conclusion that the veins go down; and the intention eventually is to drive a new adit from near Muhlbach under the circles marked. In the meantime two new shafts will be sunk in order to facilitate more rapid production.

The ore averages about 3 per cent. copper. During the last twelve months 23,000 tons of ore was extracted. From this, 7000 tons of picked ore and concentrates was obtained, which on being smelted yielded 615 tons of copper. The ore ready for stoping amounts to nearly 450,000 tons. An equal quantity of probable ore, partly developed, can be reckoned on with safety. There appears also to be good reason for counting on all the lodes going down to the level of the proposed Muhlbach adit, so that three million tons may be put down as possible ore. No estimate is made of ore east of the present levels, along the lodes towards Ausserfelden; but here again there should be some valuable reserves of ore for the company These estimates, and the recommendations for opening up the property on a larger scale, are made by Mr. Robert Addie, who is a careful mining man and not inclined to overestimate the possibilities for the future.

The power employed is derived entirely from water. Part of the plant is driven direct by turbines, and the remainder by electric power derived from a separate turbine plant. The hoisting, drilling, and lighting are all done electrically. When the new installations of machinery are erected, it is intended to place a turbine plant lower down the valley at Muhlbach, to supply all power and light from that center.

The Harris Annealing Box.

William E. Harris, of Niles, Ohio, has designed an annealing box in which improved means are provided for stacking or piling the sheets. This is in order that they may be more conveniently handled, to prevent the spilling of the mineral medium and the consequent loss, to anneal various sized sheets at the same time and to permit them to be stacked upon one another. It also provides for a more uniform heating of the piled sheets. A series of superimposed boxes is provided and a pile of sheets or plates arranged in separate series. One box is employed for each series of plates or sheets, and within the box between the sides of the sheets, and the sides of the box are means for preventing the displacement of the sheets. Removable cross bars or rails extend over each box and are designed to support the next superimposed box.

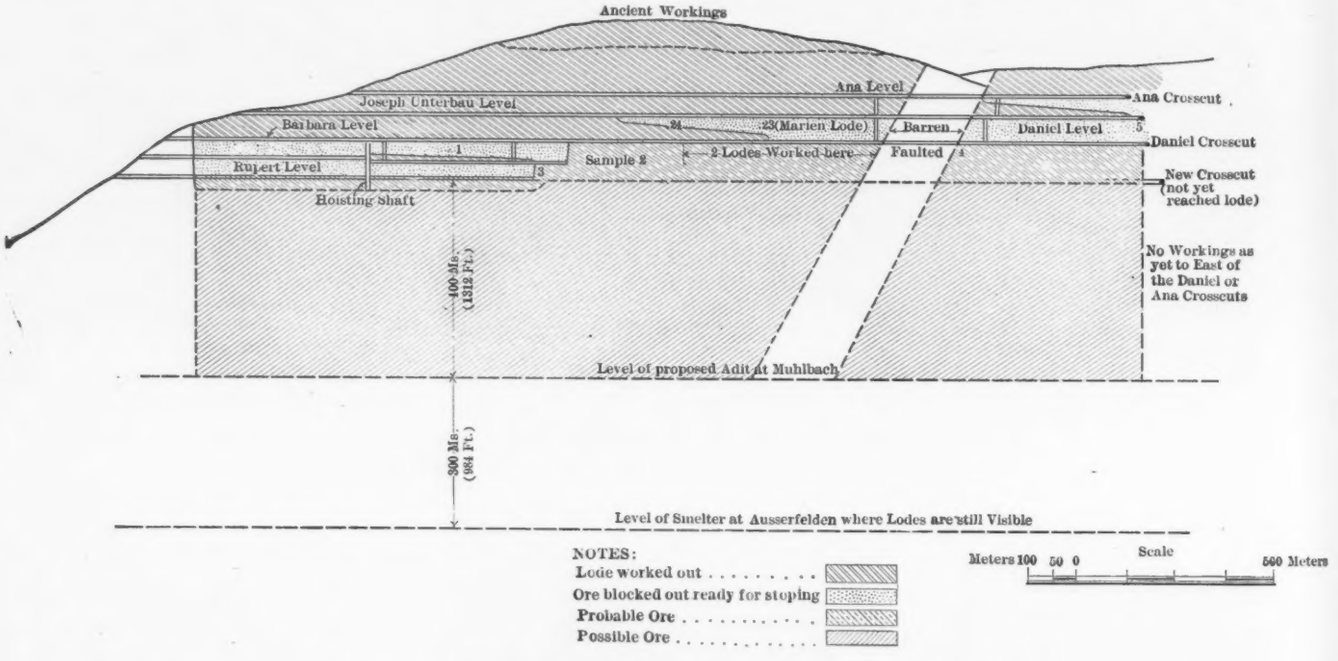


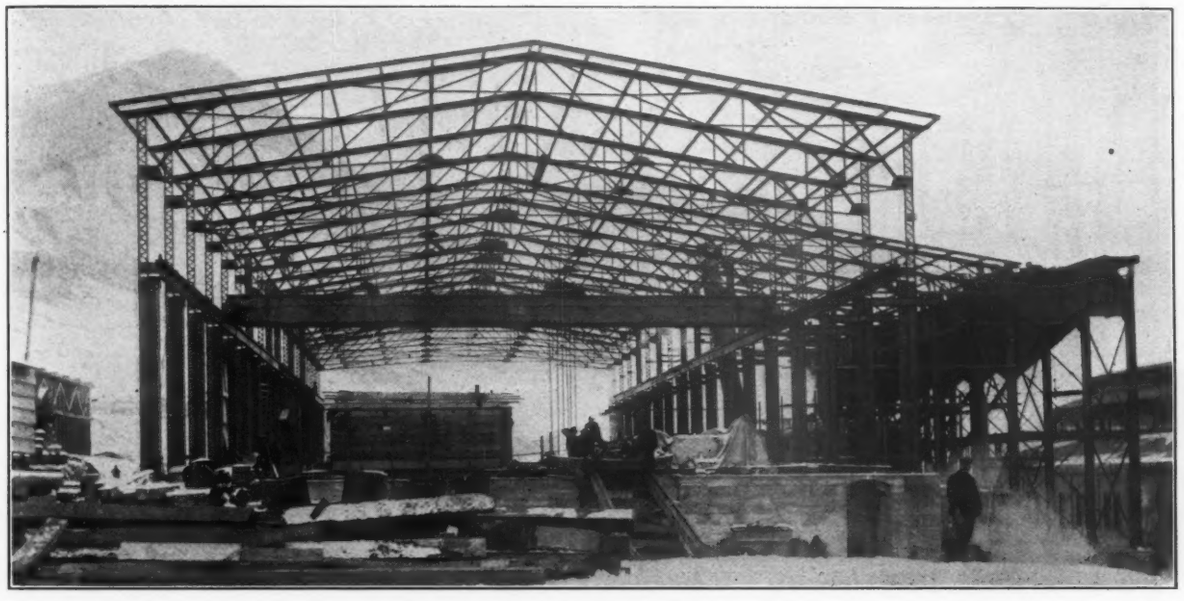
FIG. 3. LONGITUDINAL SECTION.

The Garfield Smelter.

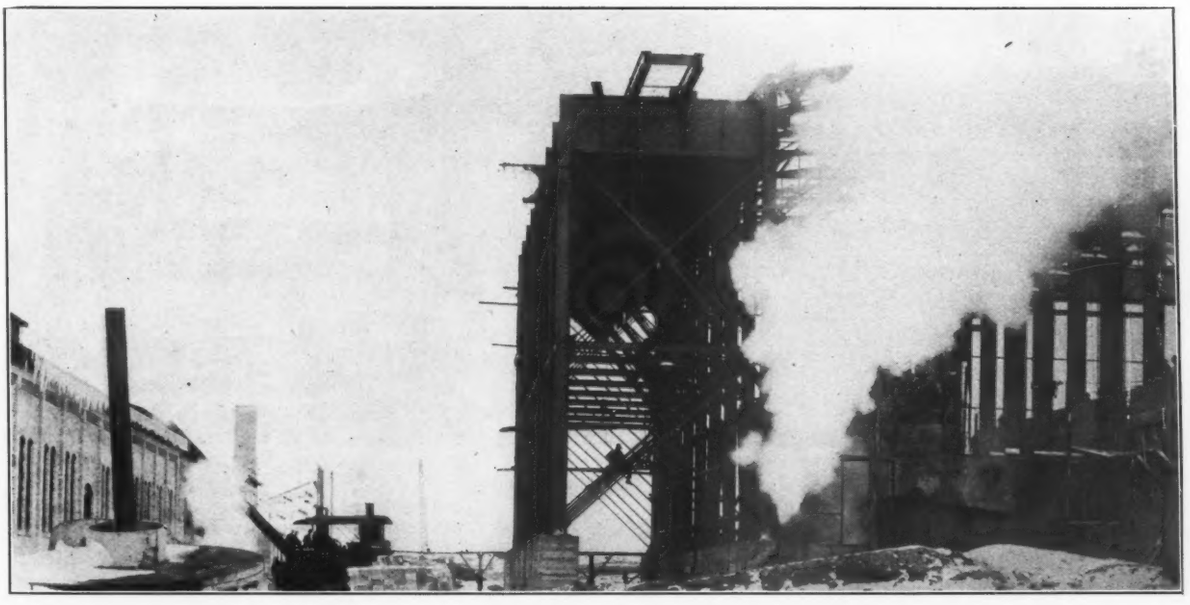
BY L. H. BEASON.

The Garfield Smelting Company, an allied corporation to the American Smelting and Refining Company, which is now spending about $1,000,000 in the construction of a copper-smelting plant at Garfield, along the south shore of the Great Salt Lake in Utah, will be ready to commence the reduction of ore about May 1, when a record in smelter building. The first ground was broken for this immense plant, August 17, 1905, and since that time the whole side of a mountain has been torn away to make room for the foundations of the group of large and small buildings; railroads have been built, and many other things have been done to give employment to an army of men, from the skilled mechanic and artisan down to the common laborer.

Because of the extremely rapid pace at which mine development has progressed in the West during the past few years (particularly in the districts of Utah and Nevada which are tributary to Salt Lake City, the smelting center), mine owners were confronted with the rather unusual spectacle of inadequate facilities for the treatment of their ores, which, in many instances, were a drug on the market. I know of cases where producers were unable to sell the product of their mines because of the congestion existing around the custom-smelting plants; and there are other cases on record where smelter managers requested their regular customers to curtail ore extraction until such time as the situation could be relieved.



POWER HOUSE SHOWING CRANE-GIRDER.



COAL BINS IN CONNECTION WITH POWER HOUSE.

the first unit of 1500 tons is scheduled to go into commission.

Notwithstanding the fact that the present winter in Utah has been unusually long and severe, the management is making

The startling developments made in the big copper mines of Bingham, and the execution by managers of plans to operate their properties on an enormous scale, necessitated prompt action on the part of

the American Smelting interests to forestall any effort toward the erection of independent plants. The smelting company first succeeded in getting the principal producers to contract their output to it for a term of years, on a basis favorable to both parties concerned. Then followed the working out of plans to build a smelting plant large enough to handle the tonnage contracted for. So, in due time, the site was selected, and in a portion of Salt Lake county far removed from the farming districts where the danger of destruction to vegetation by fumes is remote, indeed.

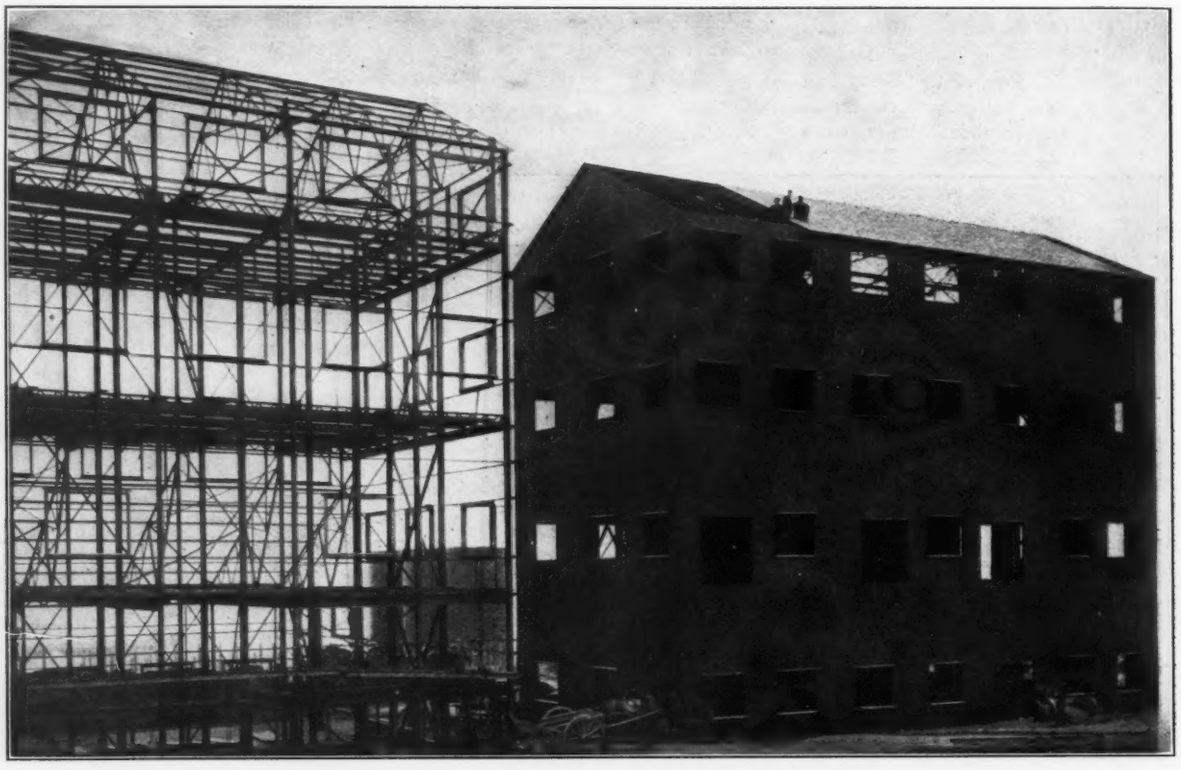
The Garfield plant, when completed, will cover an area of about 30 acres, and is to be 33 per cent. larger than originally planned. It will be reached by all the railroads centering at Salt Lake; being on the main lines of the San Pedro, Los Angeles & Salt Lake, and Western Pacific railroads. The Rio Grande Western comes in over a branch line; while the Oregon Short Line has traffic arrangements with the San Pedro, Los Angeles & Salt Lake which give it access to the smelting works.

At this writing there are close to 1500 people employed in construction; some buildings have been completed, while others are rapidly taking form.

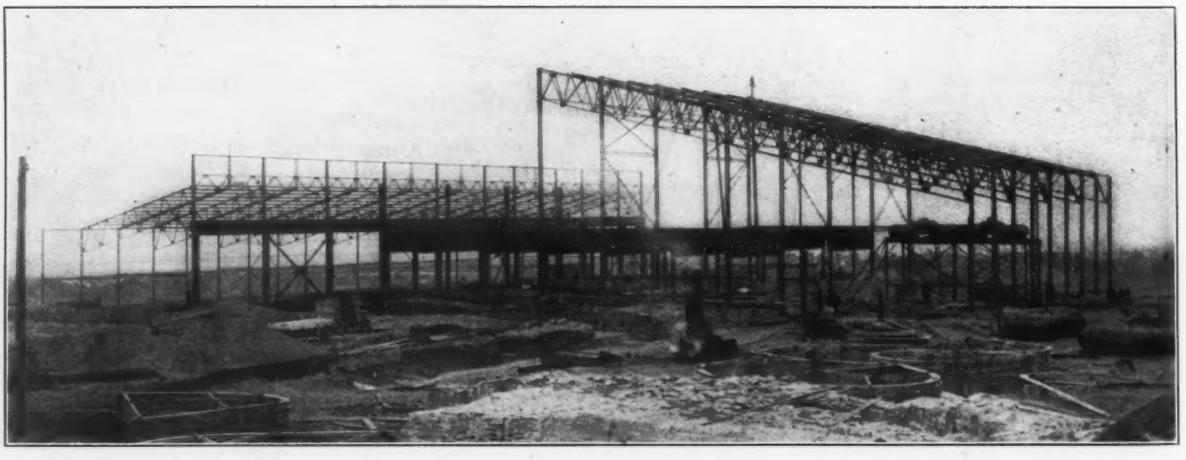
Aside from the general offices, assay and chemical laboratory, mess house and officers' residences, which are being built on the old Spanish design, there will be nine other buildings, seven of which are being constructed by the Minneapolis Steel and Machinery Company.

The blacksmith shop, completed several weeks ago, occupies a space 45x75 ft., and is equipped with every necessary modern labor-saving device; the machine shop, 80 x195 ft., is also finished and in use. The finishing touches are being put on the power house, 130x256 ft.; this building will contain all the steam and electrical power equipment required for the operation of the plant. The power house is equipped with seven overhead coal-bins with capacity for 70 tons each. This trio of buildings is of brick-and-steel construction.

The McDougall-roaster building, 60x



SAMPLING MILLS.



MAIN SMELTER BUILDING.

222 ft., the construction of which is well advanced, will contain sixteen 18-ft. furnaces. Two sampling mills are being built, 72x82 ft. The main building of the lot (which is to hold the reverberatory, blast furnace, converter and bullion departments) will rest on concrete foundations within the area of 360x305 ft. Two reverberatory furnaces are now being installed, and preparations for the third are under way. The dimensions of these furnaces are: Length of hearth, 112.6 ft.; width of hearth, 19 ft.; length of grate, 7 ft.; width of grate, 16 ft. The foundations are already in for two blast furnaces, which measure 42x240 in. at the tuyeres, and are arranged with mechanical feeders; while foundations have been provided for a 14-ft. forehearth.

Just to the north of the reverberatory furnaces are four converter stands, each 96x138 ft. A Huntington & Heberlein converter plant, with 20 pots, is also to be installed. Two 60-ton Shaw electric cranes, also a 10-ton auxiliary, with a 60-ft. span, will operate the full length of the main building. In the power house, another electric crane has been set to operate over an 80-ft. span. In the machine shop is still another, while in the blacksmith shop are various other devices for the lifting and moving of heavy things.

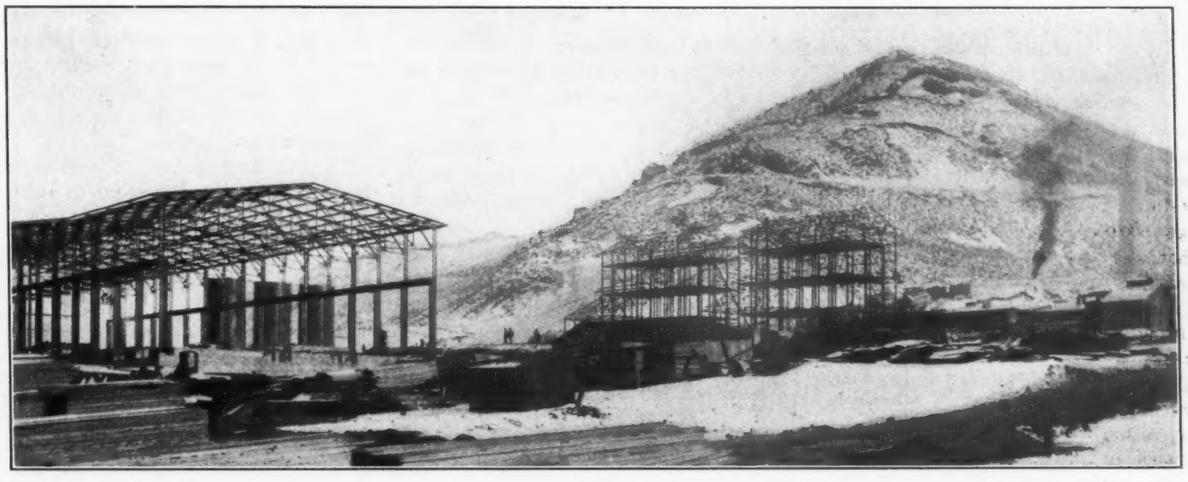
The main building will be constructed entirely of steel. The carpenter shop, a wooden structure, 28.8x80 ft., being one of the first needed was among the first finished; it is equipped with a 15-h.p. electric motor, which supplies power for the various wood-working machines. The warehouse, another steel structure, completing the group, is 44 ft. wide and 110 ft. long.

The smelter has been built with the view of immediate expansion; but the first object of the management is to get the initial unit of 1,500 tons into commission at the earliest possible date. In the extensions that are to be made as soon as the initial unit is out of the way, the reverberatory furnaces that are to be added will be located just to the west of the present reverberatories; the blast furnaces will be put in east of the present blast furnaces. Eventually, the smelting capacity of the plant will be brought up to 5000 tons of ore per day, possibly more.

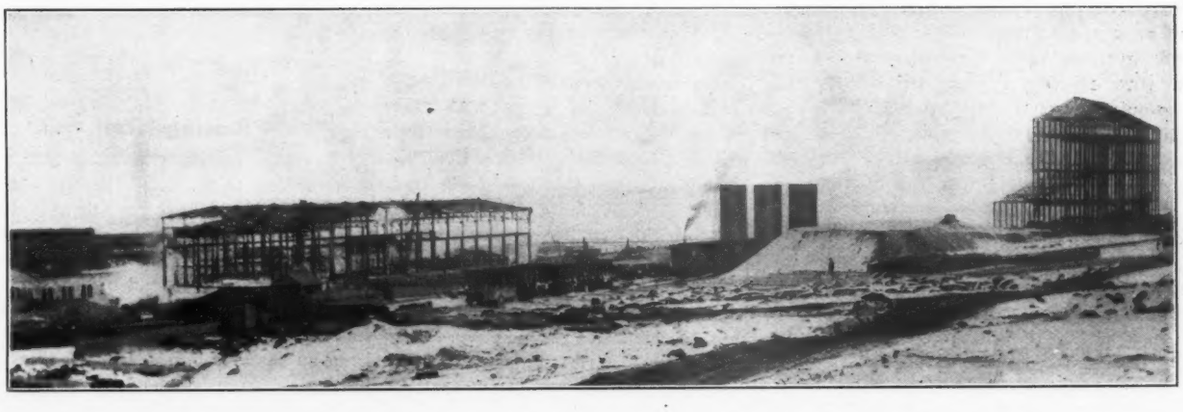
Large bins are being constructed, and when the plant first goes into commision there will be storage for 25,000 tons of crude ore and concentrate. After being dumped into these bins from the railroad cars in which it comes from the mines or mills, the ore is conveyed, by a Robins belt, to the sampling mill where it goes through the usual processes. From the sampling mills, some of the ore goes to the blast-furnace bin where it is bedded, while the fines are moved on to the McDougal roasters in the main building about 140 ft. away from the sampling mills, and so on through every process of smelting.

The slag is to be taken away from the furnaces in 10-ton slag pots drawn by electric motors.

The huge stack, which will carry off the smoke and fumes, will be 300 ft. in hight above its base. From the top of the stack to the converter floor, the difference in elevation is about 500 ft. The inside measurement of the stack is 30 ft. The contract for this construction was let to the Alphons Custodis Chimney-Construction Company. Three flues, of Fogh construction, (each 2300 ft. long, from reverberatory furnaces to stack). stand to a hight of 24 ft. above the foundation. The shape is ovel; the width at the base is 24 ft. The thickness of the walls is 13 in. The flues are provided with numerous openings and with hopper bottoms to facilitate cleaning.



VIEW SHOWING STACK AND MOUNTAIN IN BACKGROUND.



CRUSHER BUILDINGS, WATER-TANKS AND POWER-HOUSE.

Work on the flues has progressed steadily all winter, with workmen laying brick at the rate of 40,000 per day. In some of the coldest weather, the concrete for some of these flues was laid, tested, and found to be satisfactory.

Some idea of the vast quantity of cement required can be gained from the statement that an average of three carloads has been received daily for more than three months; this means that between 300 and 400 car-loads have been used to date. About the same number of cars of brick were used during the same period. It is estimated that each car will hold about 22,000 brick; in the flues alone, more than 2,000,000 brick have been used up to the present time.

Of lumber for the construction of ore bins, trestles, etc., more than 10,000,000 ft. has been shipped direct from Oregon. Of structural steel used, the main smelter required 18,000 tons; the power-house, 550 tons; the McDougal-roaster section, 350 tons; the flue supports, 830,000 lb.; the trestles, 627,000 lb.; two crusher buildings, 680,000 lb. In addition to this was what was required in the construction of the other buildings.

The smelting company will operate a railroad system within its own domain. Tracks are being laid for 13 miles. This mileage will consist of side tracks, switches and spurs of standard gage. Of the trackage stated, 10,900 ft. is built on wooden trestles, and 1100 feet on steel trestles. The yards at present are connected with the tracks of the Rio Grande Western and San Pedro, Los Angeles & Salt Lake; the former comes into the smelter grounds from the east, and the latter from the west. The Rio Grande had to build about 16 miles of road from its Bingham branch line; while the San Pedro found an easy grade to the ore bins above the smelter from about two miles out. The maximum curvature of either of these roads does not exceed 10 deg., while the maximum grade is not over 3 per cent. The smelter yards will accommodate about 400 railroad cars. In the construction of the smelting company's tracks, 100,000 cu.yd. of excavation was removed, one-half of which was solid rock. Seventy-five pound steel is being used. In addition to the standard-gage track, the company has 3.4 miles of 3-ft.-gage track over which electric motors will operate, connecting the various parts of the works. Sixty-pound rails will be used on this line, 1600 ft. of which is being constructed over trestles.. The water supply for the smelter will come partly from a point west of the smelter about eight miles, and partly from Kessler's springs, about three miles east of the plant, being furnished by the Garfield Water Company. The Garfield townsite has been laid out at an advantageous point (between three and four miles east of the smelter) by the Garfield Improvement Company, another auxiliary company; contracts have been let for the immediate construction of 90 buildings, including a large boarding house, a bath house, cottages and other accommodations for 500 people. The buildings are all to be electric lighted, and provided with modern conveniences. The town will be tastefully laid out, and will have the advantages of an up-to-date water system; the water for domestic and other uses is to be conveyed by gravity through a concrete flume (2½x4½ ft.) over a distance of 8½ miles. The water system will cost about $250,000.

For the present, at least, the town of Garfield will be kept under the control of the Garfield Improvement Company, which will lease property and grant concessions to persons desiring to enter into business. Numerous requests have already been received from merchants and artisans of all kinds. These applications will be passed on by the directors of the Garfield Improvement Company, who are inclined to foster competition, at the same time exercising caution about granting permits to persons who would not constitute a desirable population. In this connection, it seems to be the policy of the management not to grant concessions to saloons. While liquors will be sold in the town, it will be done only in club houses, operated at about what it costs to run them, and under rules which do not permit of over indulgence. This plan has has been tried successfully at Newhouse in Beaver county.

The townsite is situated midway between the smelter and the new concentrating mill now under construction by the Utah Copper Company. Electric railways will connect the town with the smelter and surrounding reduction works. The proposed mill of the Boston Consolidated Mining Company will be built near the townsite. Suburban trains will be operated over the San Pedro, Los Angeles & Salt Lake, and Western Pacific railroads; the Rio Grande Western will also inaugurate passenger service between Bingham Junction and Garfield.

The General Electric Company is supplying all the electrical equipment for the allied Garfield companies.

Charles W. Whitley is the executive head of all the American Smelting interests in Utah. Hence the Garfield Smelting and kindred concerns will be operated under his direction as general manager. B. H. Bennetts is superintendent of the new smelting plant; with F. C. Knight as his assistant. These gentlemen have also looked after the details connected with the building of the large works. Karl Eilers is consulting engineer, and F. M. Martin, chief engineer.

The photographs illustrating this article were obtained through the courtesy of the Minneapolis Steel and Machinery Company.

Open-hearth Steel Production in the United Kingdom.

The British Iron Trade Association has completed and published the figures for open-hearth steel production in the United Kingdom in 1905. The total make is reported as follows:

	1904. Tons.	Per Ct.	1905. Tons.	Per Ct.
Acid	2,583,282	79.6	3,084,510	79.5
Basic	662,064	20.4	795,238	20.5
Total	3,245,346	100.0	3,879,748	100.0

The change in proportions of acid and basic steel was very slight. The increase in acid steel last year was 501,228 tons, and in basic, 133,174 tons; the total gain over 1904 being 634,402 tons, or 19.6 per cent. By districts, Scotland led in the production of acid steel, with 1,126,428 tons last year; while Staffordshire and Lincolnshire were first in basic steel, with a total of 240,488 tons.

The finished forms in which open-hearth steel was sold, so far as reported, were as follows, in long tons:

	1904.	1905.	Changes.
Blooms and billets	304,198	402,535	I. 98,337
Plates and angles	1,456,146	1,765,111	I. 308,965
Bars and tin-plate bars	662,024	839,415	I. 177,391
Rails	77,160	108.953	I. 31,793

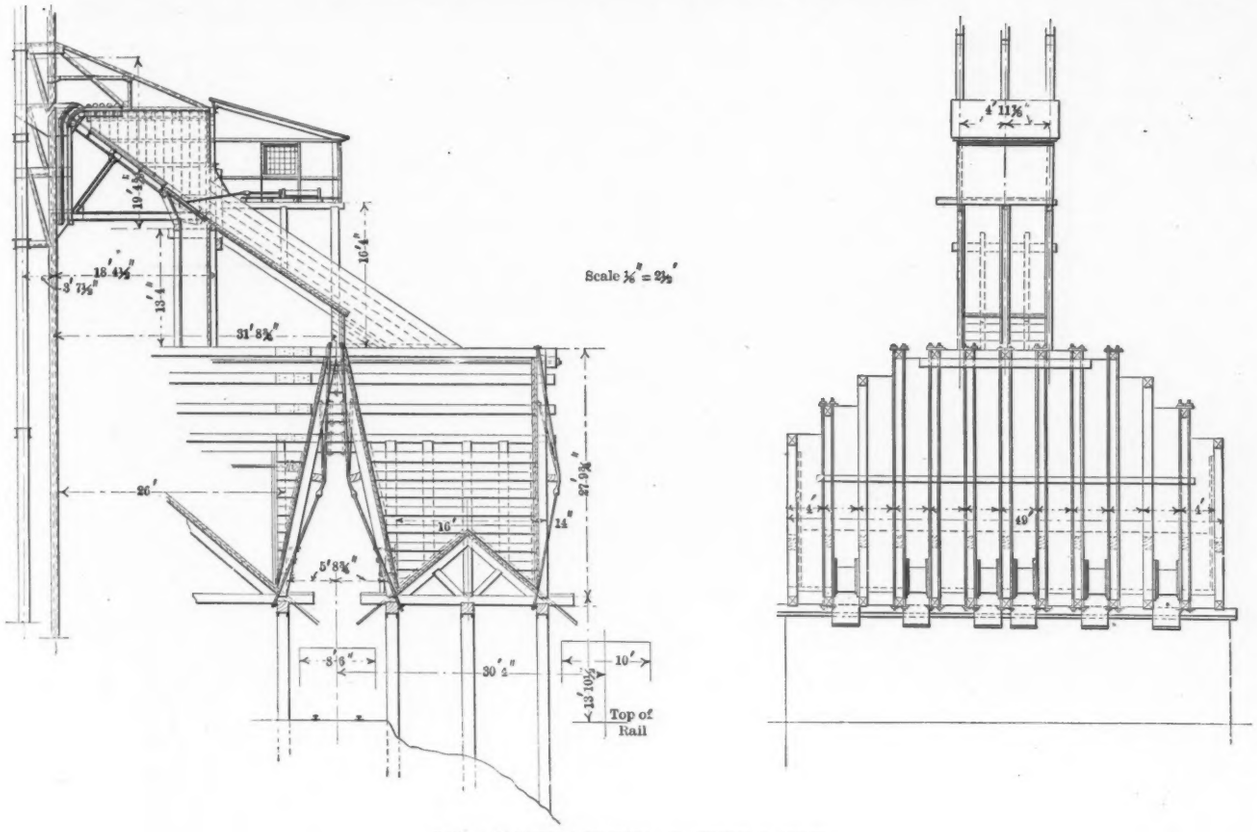
These figures are not complete, castings not being included, while tires, axles and other forgings are also lacking.

The average number of open-hearth furnaces in operations during 1905 was 383, giving an average output of 10,130 tons per furnace. At the end of the year there were 514 open-hearth furnaces in Great Britain, of which 376 were acid and 138 basic furnaces. There were also 15 new furnaces under construction.

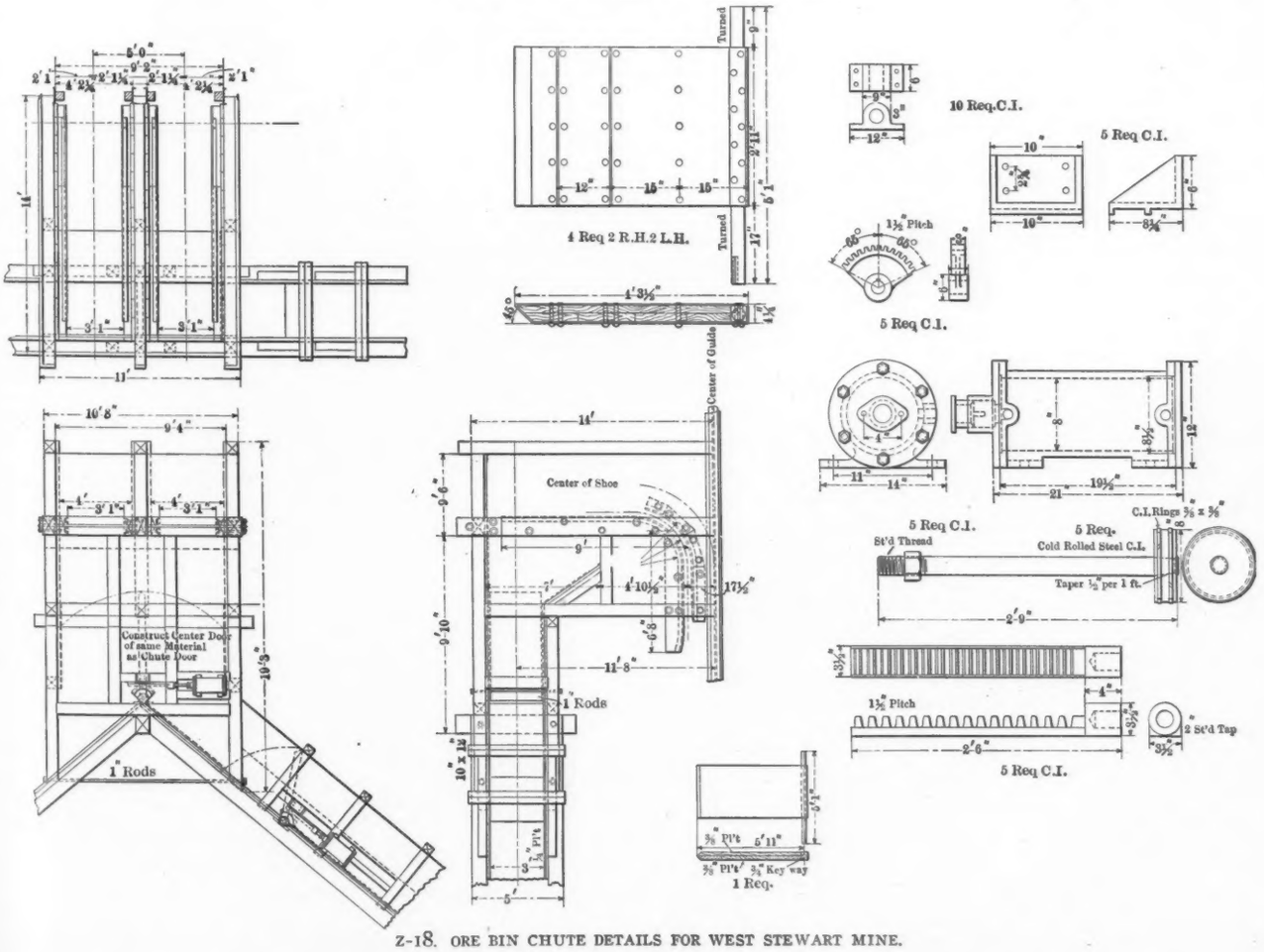
Bearing Metal.

According to R. C. Carpenter, a bearing metal should have considerable adhesion to a lubricant and be readily wet by it, should be softer than the shaft so that it will be injured instead of the shaft, in case of grit in the bearing or of failure in lubricating; it should be hard enough to keep its shape under such loads that may be applied to it, it should have a lower melting point than the body of the journal, and it should not adhere to the shaft when melted. For ordinary purposes, babbitt metal is recommended, but for more severe conditions a mixture of 50 per cent. aluminum, 25 per cent. zinc and 25 per cent. tin is advised.

One after another, the European countries are adopting nickel in place of bronze coinage. France issued two series of 5-centime pieces a year or two ago, and now it is stated that the Bulgarian ministry is presenting a proposition which tends to withdraw the bronze one and two-cent pieces and replace them with nickel. Four million coins will be struck.



Z-29. ORE-BIN ADDITION AT ORIGINAL MINE.



Z-18. ORE BIN CHUTE DETAILS FOR WEST STEWART MINE.

HOISTING METHODS AT BUTTE.

The von Schulz & Low Method of Zinc Determination.

A. H. Low, writes in *Electrochemical and Metallurgical Industry,* Feburary, 1906, with respects to his method for the determination of zinc, as follows:

Comparatively few chemists appear to be using my method precisely as I described it. There seems to be a disinclination on the part of technical chemists to follow any method not their own just as its author dictates. Even my own assistants have to be watched in this regard. Each operator thinks he sees short-cuts or improvements, or some modification "just as good." with the result that the straight method is rarely employed. Thus I have found in a number of instances that chemists claiming to use my zinc method are not, properly speaking, using it at all, and yet the method is forced to suffer the opprobrium due to their inferior work.

Whenever my methods are employed in my own laboratory it is because I know of no better technical ones, and I certainly stand ready to adopt something different as soon as it is actually demonstrated that my zinc method is "worse than useless." My assistants can easily make an ordinary zinc determination in 20 minutes, and the repeated assay of prepared mixtures of known composition, containing all the usual constitutents of ores, has amply demonstrated the accuracy of their work.

L. U. Campbell, of Gaffney, S. C., has a large amethyst, found in a monazite mine a few miles above that place. It is hexagon shaped, the sides being smooth, as though cut by hand; it weighs 7 1/5 ounces.

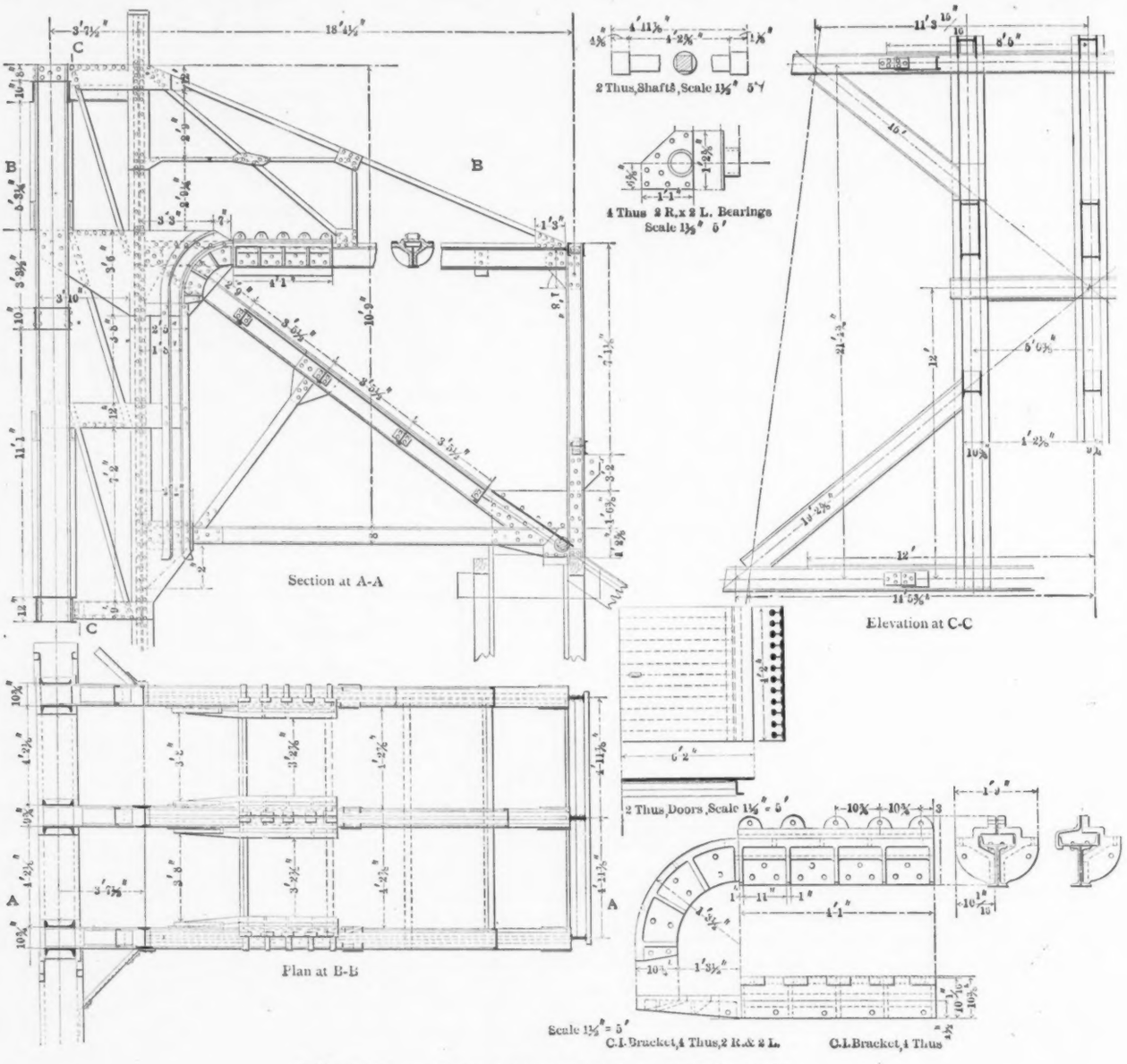
Hoisting Methods at Butte.

Owing to the large number and the size of the drawings accompanying the article by A. W. Wethey, published under this caption in the issue of this JOURNAL, March 10, 1906, p. 463, we have presented the remainder of them in this issue. They are largely self-explanatory and show some valuable features of the mining practice at Butte.

The drawings should be compared, in order to reach a clear understanding of their importance, with those shown in the former issue. They comprise the following:

Z. 29—This shows the ore bin added to that previously existing at the Original mine. This is drawn to the same scale as Z. 17 and shows the changes made in the former arrangement.

Z. 18—This shows the system of gates

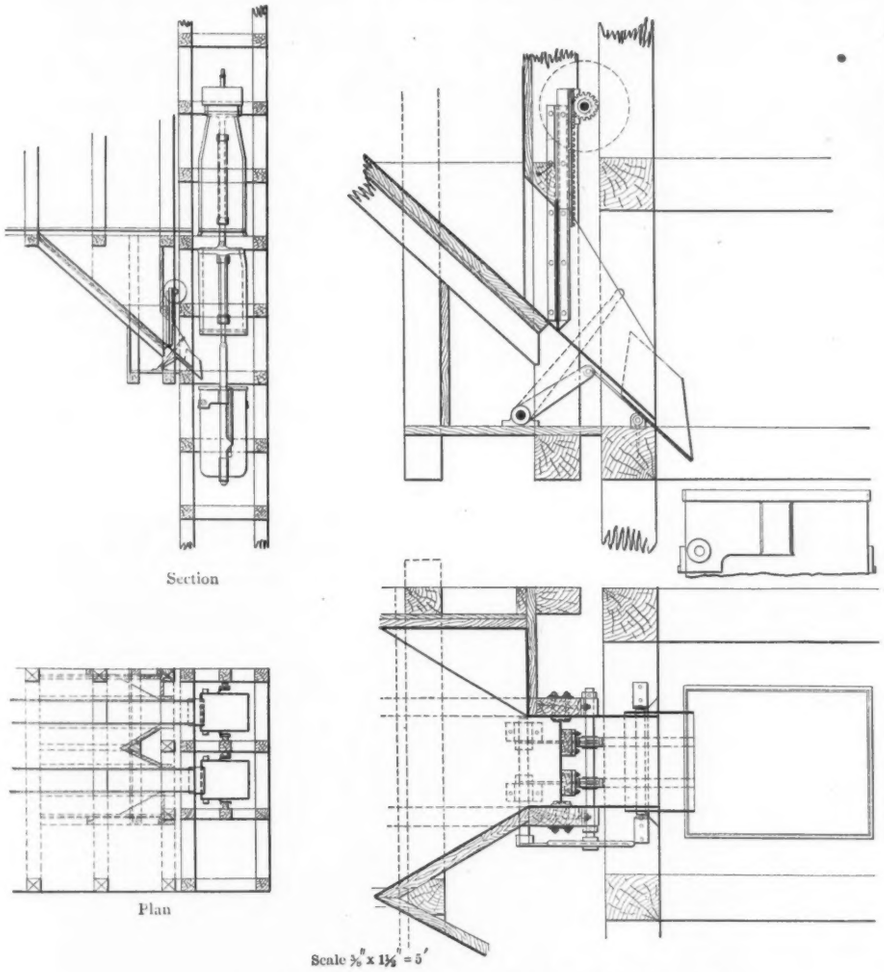

Section at A-A
Elevation at C-C
Plan at B-B
2 Thus, Shafts, Scale 1½" = 1'
4 Thus 2 R. x 2 L. Bearings
Scale 1½" = 1'
2 Thus, Doors, Scale 1½" = 1'
Scale 1½" = 1'
C.I. Bracket, 4 Thus, 2 R. & 2 L.
C.I. Bracket, 4 Thus

Z-28. STEEL DUMP FOR GALLOWS-FRAME AT ORIGINAL MINE.

used in the dump, and the manner of distributing ore into the bins. Details of the various parts of the gates or doors are also given.

Z. 28—This drawing shows in more detail, and on a larger scale, the construction of the steel dump shown in drawing Z. 29. The dumping section in the latter is shown at the upper left-hand corner, and will be recognized upon comparison of the two drawings.

Z. 25—This drawing completes the set and shows the underground station bins or storing hoppers for loading the skips. A portion of the skip-top is shown hanging in the shaft as now operated at the Original mine. In the plan view, the limit lines of the skip and cage are shown (just below the elevation, in the lower right-hand corner). In this drawing will be noticed the extension chute, operated by the lever shown in the elevation, and the cage and skip, in the proper relation to these station bins, are shown in the section.



Z-25. STATION BIN FOR LOADING SKIPS, ORIGINAL MINE.

Tin-plate can be laid on roofs of any shape or size. Its cleanliness is an important factor in localities where rain water is collected in cisterns for household use.

Iron Mines of Mexico.

For the exploration of some of the iron fields three companies have recently entered Mexico from the States. They are the Pacific Iron Works, which has taken up 660 pertinencias (1600 acres) of iron land at Carrizal, on Las Truchas mountain, in the state of Michoacan; the Mamey Iron Works, of Duluth, which is preparing to start work on the iron deposits near Alvarez, in Colima, and will establish an electric power plant on the Mamey river; and it is reported that the United States Steel Corporation has bought the famous iron mountain of Durango. This was discovered in 1562 by Gines Velasquez del Mercado and hence is known as the Cerro (Hill) del Mercado. This hill rises abruptly out of the plain, with a more or less elliptical base 4800 ft. long by 1100 ft. wide with hight of 640 ft. in which it is estimated there are 300,000,000 tons above the level of the plain. A great many years' work shows an average of 70 per cent. iron. In 1830 Alexander von Humboldt, though unable to visit it said, from descriptions and specimens brought him, that it was "identical with the aerolite that fell near Agram, Hungary, in 1751."

Mineral Production of Great Britain for 1905.

Some statistics of the mineral output of the United Kingdom for 1905 (as given in advance sheets of the reports on working under the coal mines and the metalliferous mines regulation acts) follow herewith. Corresponding figures for 1904 are given for comparison. In neither year, are returns from quarries included; so that the figures for iron ore, stones and clays, are not complete; those for coal and the ores, except iron, are substantially correct. Quantities are in tons of 2240 pounds.

	1904	1905
Arsenic	976	1,528
Barytes	25,589	28,357
Bauxite	8,700	7,300
Coal	232,411,784	236,111,150
Fluorspar	16,889	37,998
Gold ore	23,203	15,981
Iron ore	9,161,588	9,629,713
Pyrites	10,287	12,186
Lead ore	26,371	27,482
Manganese ore	8,756	14,352
Silver ore	35	14
Tin ore, dressed	6,000	6,324
Tungsten and Uranium ore	156	266
Zinc ore	27,655	23,647

Persons employed underground in mines, under the coal mines act, in 1905 numbered 691,112; and above ground, 167,261. Those employed at metalliferous mines numbered 17,282 below and 11,865 above ground.

Gold Output of Dutch Guiana for 1905.

BY E. H. TEATS.

This industry shows a marked increase over 1904, considering the fact, that all of the gold produced in the Colony has been by hand-work using crude long-toms and sluices.

A large part of this has been by what is known as the á la par or "pork-knocking" system, whereby the concessionaire receives from 10 to 20 per cent. royalty on all gold produced. At present a dredge is being enstalled by an American company under the direct supervision of a competent, practical and experienced engineer, who has spent time enough on the ground to satisfy himself as to values, climatic and labor conditions. Records of the Paramaribo office show duty paid for 1905 on 1071.316-kg. produced from the district as follows Surinam, 416.108; Saramaca, 213.509; Murowyne , 188.545; Lawa, 253.136; Total, 1,071.316 kg.

The record for the gold production of Dutch Guiana for the last few years, is as follows, with the value corresponding, reckoning 1 kg. as worth $640:

	Weight Kilograms	Value
1902	586.602	$375,425.28
1903	682.489	436,798.96
1904	801.800	513,152.00
1905	1071.316	685,642.56

The First Pool Mines.

EDITORIAL CORRESPONDENCE.

The Pittsburgh Coal Company's First Pool mines 1 and 2 are on the Wheeling Division of the Baltimore & Ohio Railroad, at Willock, 9 miles directly south of Pittsburg. The first is a drift opening and the second reaches the coal by a shallow shaft. Both are provided with modern tipples and both ship all their coal for fuel, no coke being made in the vicinity.

At this point, the Pittsburg seam is nearly flat although a local depression here and there involves additional haulage difficulties. The cover is nowhere heavy, and over large areas is less than 100 ft. A complete average section of the coal-bearing horizon at the First Pool mines may be stated thus, in feet:

12.	Slate	0.7
11.	Coal	0.3
10.	"Checker"	2.4
9.	Roof-coal	2.0
8.	Draw slate	0.5
7.	Breast coal	2.9
6.	Binder	0.03
5.	Bearing-in coal	0.3
4.	Binder	0.04
3.	Upper bottom coal	1.0
2.	Lower bottom coal	1.1
1.	Limestone floor	

The "checker" is an oily, black shale rich in combustibles; in fact, when a mine fire occurs, this "checker" transmits the combustion more rapidly than the coal itself, and is not uncommonly shot down to check the progress of a fire. Strata Nos. 11 and 12 are not found everywhere. The roof coal appears massive and lustrous, but is so high in ash as to be worthless, and its mining is prohibited. It forms an excellent roof for rooms and entries and is utilized for the purpose, the draw slate being broken down as soon as a few square feet of it are exposed. All the rest of the coal is mined, in a breast 5.3 ft. high.

The main power house is midway between 1 and 2, or half a mile from each, and affords most of the power for both. Its equipment includes 2 Laughlin water-tube boilers, rated at 160 h. p. each, and 2 Erie, return tubular boilers, rated at 100 h. p. each. The small thin tubes of the former variety are a source of annoyance while using the slightly acid water of the district. In the back wall of each of the Erie boilers an opening has been made on a level with the tubes, so that they can be blown with a compressed air jet, in the natural direction of the draught. Three Norwalk, 2-stage, compressors supply the air punchers, of which there are 32 in the mines. The compressors have 24-in. stroke and 20-in. steam cylinders. The low and high-pressure air cylinders are respectively 16-and 8-in. diameter. They use steam at 95 lb., and compress air to 85 lb. per sq. inch. Norwalk air valves are mechanically controlled. A Westinghouse, 250-volt, 216-ampere, dynamo supplies a lighting system.

MINE NO. 1.

Tipple No. 1 ships the yield of four distinct tracts: To the north, one tunnel goes through No. 3 mine and beyond it, across a valley and into another hill, where the McPherson tract is being developed. These mines at present have no permanent haulage system but, with mules, maintain an output of 125 wagons per day. To the southeast, mine No. 1 is about exhausted, except for some stump and pillar coal. Beyond it, in another hill, but tributary to the same tunnel, the Walton Extension is sending out 650 wagons per day. One of the Walton's farthest workings has connected with the back entries of the Allequippa, one of the old river mines. The Walton Extension is thus the only one of the four to show any activity.

Mining—The coal is attacked by double face and butt entries, and room-and-pillar mining. It has been found that the course N. 67° W., is an average of the direction of butt cleats throughout a wide area, and this course is therefor adopted for butt entries, rooms being driven full face on. It is thought that the irregularity of grades in rooms and headings entailed by a strict adherence to this rule is more than compensated by the free working of the coal and the methodical exhaustion of the ground. Headings are driven 8 ft. wide and 50 ft. between centers, leaving chain pillars of 42 ft. Then for a barrier pillar on the outward side of each face heading, 60 ft. of coal is left between it and the first room on the butt entry. Rooms are turned at right angles from butt entries, 36 ft. between centers, and 8 ft. wide. When in 21 ft., they are widened squarely to 21 or 24 ft. leaving pillars of 12 or 15 ft.

Sullivan air-driven punchers are used in the First Pool mines. The runner makes an undercut 6 ft. deep and 20 in. high at the front; in the course of undercutting his scraper will shovel out as cuttings about 30 per cent. of the total yield of the advance. The wastefulness of this method however, is more apparent than actual, since a strong demand for slack coal has

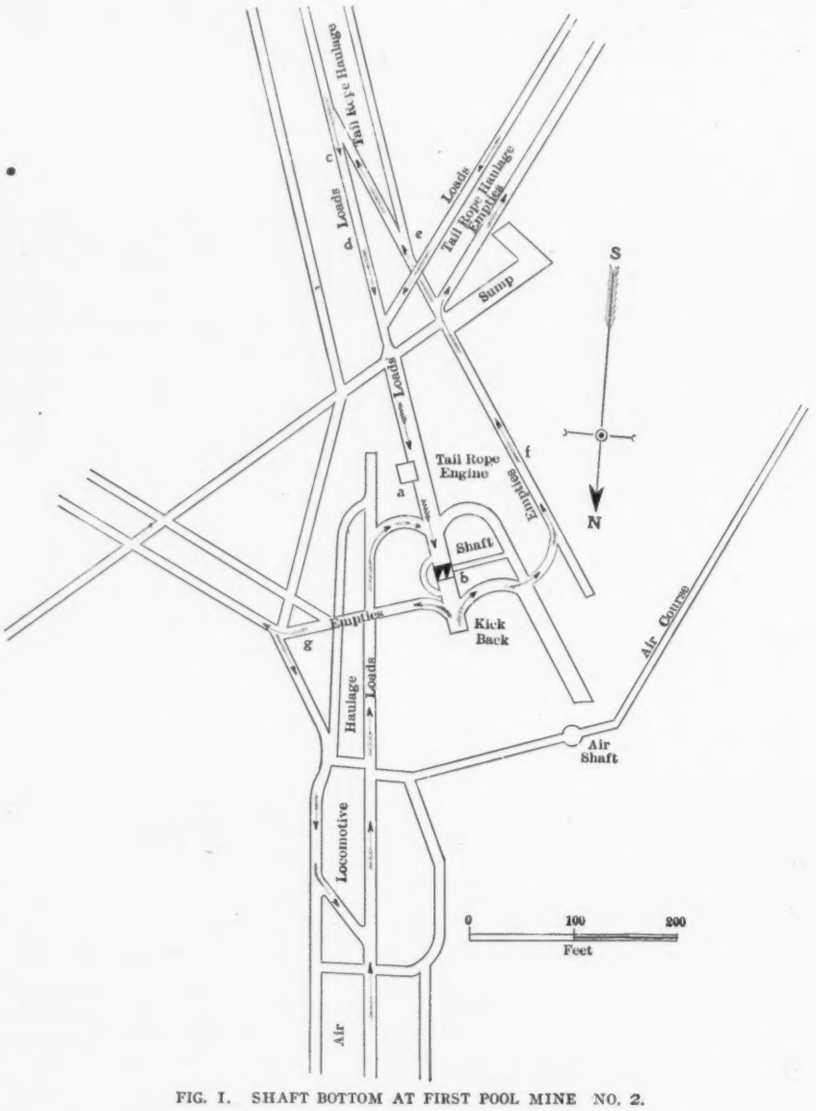


FIG. 1. SHAFT BOTTOM AT FIRST POOL MINE NO. 2.

set in from the operators of mechanical stokers; it has even been proposed to crush lump coal to meet this demand. In case of a heading, two 1¼-in. holes are then bored in the coal, midway in height, 18 in. from the side, pointing upward and outward, so as to bring the powder charges on the side lines and 2 ft. from the roof. One hole is loaded with 15 to 18 in. of black powder; the other, with 8 in. They are fired with squibs, care being taken to let off the heavy charge first. The loosened coal is then loaded into wagons; the draw slate is propped long enough to permit this in safety, and is then allowed to fall, to be thrown into the gob.

Shearing is not practiced, but it ought to be, for this reason: When coal is shot off the solid, the ribs are unavoidably shattered and a thicker pillar must be retained for safety; in a given area, this necessity reserves a larger proportion of the total output to be mined by hand at hand-picking prices, and reduces the yield from the cheaper method of machine mining. The good market for slack coal, however, removes one objection usually made to shooting off the solid, while it also discounts the principal advantage claimed for the chain undercutting machine.

Haulage—The loads are collected by mules into two converging entries, one of which has an up grade of 14 per cent. for

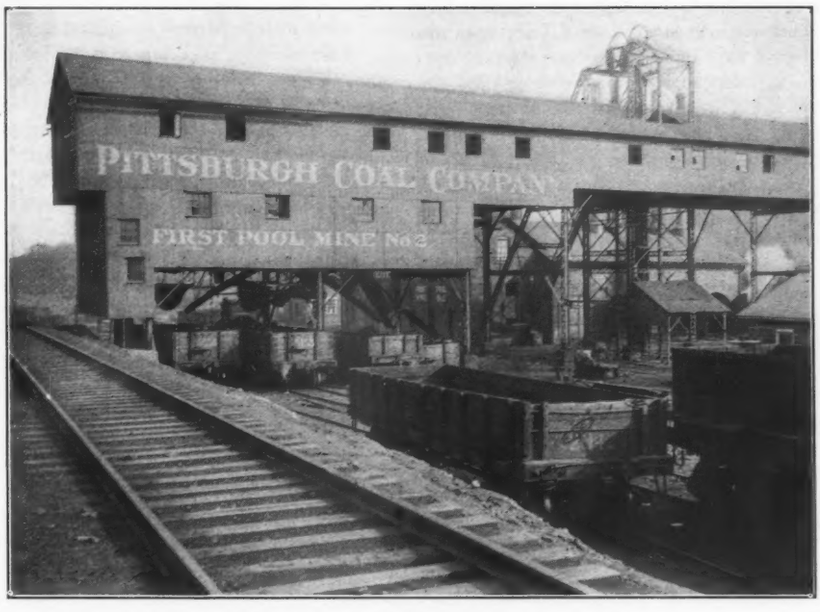


FIG. 2. TIPPLE OF FIRST POOL MINE NO. 2.

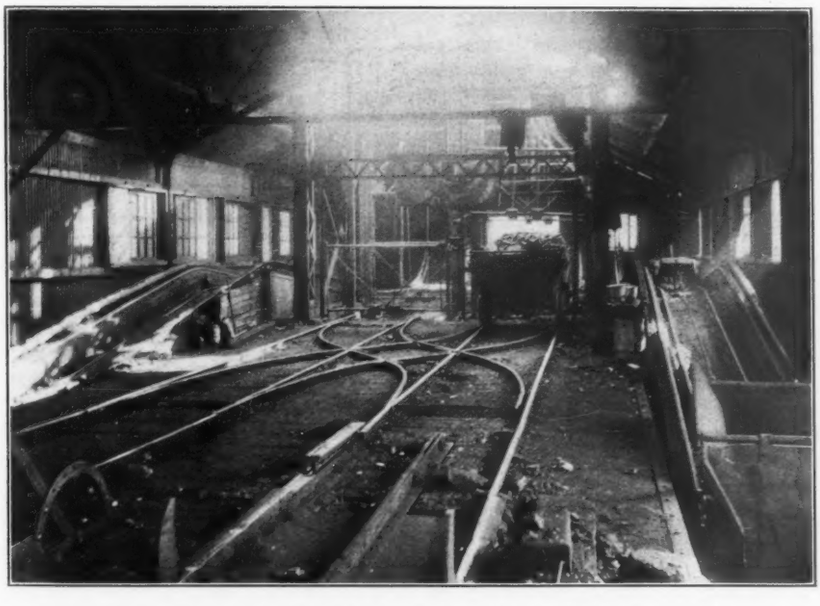


FIG. 3. TIPPLE FLOOR OF FIRST POOL MINE NO. 2.

50 ft. A Porter, compressed-air locomotive, with 9x16-in. cylinders, then unites the cars from these two entries, into trips of 75 or 80 cars, pulling them, 14 at a time, out of the up-grade entry, by a towing rope. The cars, 40-in. gage, hold 32 bu. or 1¼ ton each, and the cars weigh about ½ ton apiece, empty. The locomotive then carries the trip, down a slightly favorable grade half a mile across a valley and into the back entrance of No. 1 mine. Here head and tail ropes are attached and the trip goes 3,800 ft. further, under this power, at 6 miles per hour, to the mouth of the drift. The head of the trip is then caught by a chain haul, driven by an independent engine, and carried up-grade to the tipple floor. This haul feeds the whole trip to the tipple at about 3 cars per minute. From the kick-back, the cars return by gravity to the empty track in the tunnel.

The locomotive gets its power from a compressor at No. 2. mine, described later, though 7,200 ft. of 3-in pipe. It is charged at end of every run, 1½ mile, during part of which distance it is heavily loaded. Charging takes 2 or 3 minutes. Track for this haul is laid with 45-lb. rail. The tail-rope motor at the mouth of No. 1 tunnel is a pair of Millholland 12x24-in. slide-valve engines, both throwing under and working on a driving shaft carrying a spur wheel. This engages a gear (3 to 1) wheel on another shaft on which two independent, 6-ft., drums, controlled by hand-brakes, may be clutched or released at will. Both haulage and tail ropes are ¾-in. The tail rope is carried part of the way on overhead rollers suspended from the cap pieces of the timbered tunnel. An Erie boiler supplies power for this engine.

Ventilation.—None of the First Pool mines is gassy. In Walton Extension, a 6-ft. Clark propeller fan, set across the intake airway, and driven by a compressed-air engine keeps up a circulation.

MINE NO. 2.

The coal at this point is 50 ft. below surface. The output comes up through two compartments of a 3-compartment shaft, and a slope is used for lowering supplies and for travelling. Some of the back workings connect with those of No. 1.

Power Plant.—The boiler plant includes 1 Erie and 3 Phœnix boilers, together generating 600 h. p. They work to their capacity for 8 hours during the day, and shut down by half during the night. High-pressure air for the two locomotives, one in this, and one in No. 1 mine, is supplied by an Ingersoll Sergeant 4-stage compressor having 24-in. stroke and 2 steam cylinders of 20-in. diameter. The four air cylinders are respectively 28-, 14-, 10-, and 5 in. diameter, the first two being tandem on one side and the latter two on the other. With steam at 90 lb., air is compressed to 950 pounds. The compressor runs all the time; air not needed by the

two locomotives is used by the air punchers, pressure being lowered to their requirements by reducing valves. Another Norwalk, similar to those at the central plant, assists in supplying the undermining machines.

Hoist.—Two parallel, 18x40 in., reversible, Millholland engines are directly connected to a drum shaft carrying a 6-ft. drum with grooved face. The cages are always in balance, the two 1¼-in. ropes being attached at opposite sides, and the drum keyed to the shaft, the efficient hoist is 85 ft. The shaft carries also a small drum 30-in. diameter on which are opposing ¾-in. ropes used in handling empty cars on the tipple, as will be explained.

Ventilation.—The fan, whose housing is of brick, is a double-inlet Capell, 13.5 ft. diameter and 7.5 ft. wide. It is driven by an 8x14-in. Chambersburg engine at 90 r. p. m., at which speed it passes 1,000 cu. ft. of air per revolution, maintaining a pressure of 1.75 in. of water. Reversible doors, between the mouth of the upcast and the inlets to the fan, permit the air current to be reversed, the fan then acting as a blower. The intake is situated at the back of the mine; cross-overs are built of steel and brick.

Haulage—Coal converges at the shaft bottom from two distinct tracts. That from the north is brought in 27-car trips, for 1¼ mile up a 3 per cent. grade, by air locomotive; that from the south is conveyed by tail-rope haulage over irregular grades. The layout of the shaft bottom is shown in Fig 1. The tail-rope engine, *a*, is underground and exhausts its steam to the surface. As the loaded trip approaches within its length of the shaft, *b*, the haulage rope is cast off so that the tail rope may be brought up to meet it. The two ropes are then coupled and the direction reversed to carry the coupling back to the mouth of a siding *c*, in which an empty trip is waiting. This system draws from two diverging entries *d* and *e*, one to the rise and the other to the dip. Each has a bull wheel at its back and a separate tail rope with couplings at both ends. If it is desired to alternate the haul, the main tail rope is uncoupled and transferred to the tail rope in the other entry, the haulage rope following the empty trip. The loads all run on to the cage from the south side and the empty cars run off the other side, and down grade around to standing tracks *f* and *g*.

Tipple—The tipple whose exterior is seen in Fig. 2, is designed for the rapid handling of cars with but little labor. A double Phillips cross-over dump discharges the loads into chutes leading to screens and weighing pans, and then into railroad cars. The floor is arranged in duplicate, and cross switches permit the shifting of cars from either cage into either dump and back again, in case of obstruction at any point. The load runs from the cage, resting on chairs, down 1.5 per cent. grade to the dump, whence it is released by the following load. The empty then goes down 2.5 per cent. grade to the kick-back, and thence, down the same grade to the foot of an inclined rope-driven elevator, operated by the small drum on the main hoist, already referred to. This incline is 38 ft. long and rises 9 ft. The carriage is a small heavy truck on 4 wheels running on a narrow-gage track between and below the car rails. This truck passes underneath the empty car and behind its forward axle which it catches with an upwardly projecting swinging bar, hinged at its middle. The empty runs by itself from the top of this incline, down grade to another kick-back and then to the cage. The inclined hoist on one side travels synchronously with the cage on the same side, so that the bump of the empty car, returning from its kick-back, assists in starting the load off the cage. A photograph of this floor, is given in Fig. 3. The railroad cars under the tipple rest on platform scales, the graduated beams of which are housed in the compartment seen at the outward end of the tipple in Fig. 2. Lump, nut and slack coal are shipped in addition to run-of-mine. Everything over 1.25 in. is weighed in scale pans, suspended below the screens, before it is dumped into the car, the brass check, bearing the miner's number being sent through a tube to the weighing and recording room. This coal is weighed in the car again, before shipping; slack is weighed only in the railroad car.

Wages—Miners are paid on the basis of coal that passes over 1.25 in. bar screen. For pick mining, the price is 85c. per ton. Machine runners are paid 16.4c. per ton for the coal they undercut, and out of this they have to pay their scrapers. For loading after cutters, the price is 45 64c. per ton of 1.25 in. coal. These are the prevailing rates for room and pillar coal in seams of that particular width, and undercut by air machines. In the Walton Extension a good runner will undercut 60 tons of run-of-mine coal per day, of which 45 tons will pass the 1.25-in. screen.

Multiciplicity of parts of any system increases the cost of maintenance, repairs, and depreciation, aside from the interest on the added investment.

High altitude compression, due to the rarified condition of the atmosphere, is accompanied by an increase in power required over that necessary at sea level to produce the same results at the point to which the air is transmitted. This calls for a larger compressor. Even the additional cost of the larger machine, as far as the costs of installation are concerned, operates to the advantage of a compressed-air system.

Economy of a Rand Air Compressor.

BY LUCIUS I. WIGHTMAN.

The accompanying indicator cards (from a Rand air compressor, at the Lake View Consols Mine, West Australia) show so high a degree of economy as to be worthy of special consideration by engineers and mine managers. The air cards indicate a very high compression efficiency; the steam cards show remarkable economy when the unusual cylinder ratio is considered; and the mechanical efficiency represents a high degree of refinement in the machine design.

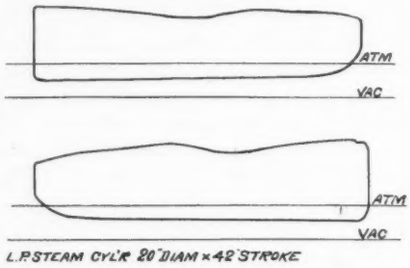


FIG. 1.

The compressor, as originally installed in 1900, was a duplex-steam and compound-air Corliss compressor. It was built by the Rand Drill Company, of New York, and was of a type known as BB2. The stroke was 42 in.; the duplex Corliss steam cylinders were 40 in. in diameter; the cross-compound air cylinders

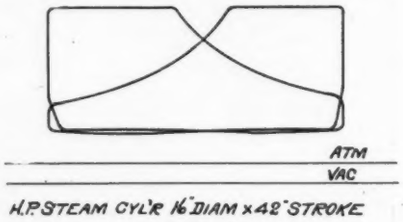


FIG. 2.

were 30 and 18 in. in diameter; with an over-head intercooler of standard Rand pattern. The low-pressure air cylinder had mechanical inlet and direct-lift discharge valves; on the high-pressure cylinder, both inlet and discharge valves

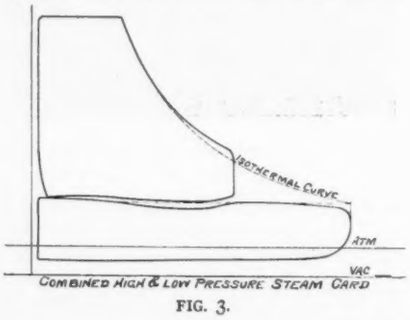


FIG. 3.

were of direct-lift type. The compressor operated as non-condensing during the first three years. At the end of this period one of the steam cylinders was found to be badly cut; it was decided to bush it

and operate the compressor as a compound steam machine, condensing. No changes were made in any other part.

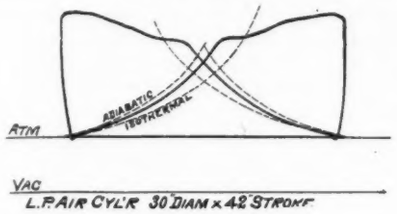


FIG. 4.

The inserted bushing was bored to 16 in. diameter, giving a steam cylinder ratio of 1 to 1.56; it is this unusual ratio which makes the steam economy found in the test so remarkable.

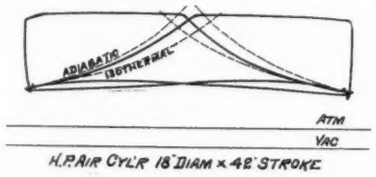


FIG. 5.

Reference may be made to the accompanying figures, as follows: Figs. 1 and 2 show the indicator cards from the low pressure and high pressure steam cylinders, respectively. Fig. 3 is the combined average steam card. Fig. 4 and 5

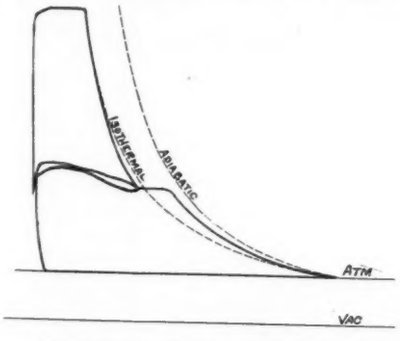


FIG. 6.

are the cards from the cylinders, low pressure and high pressure, respectively; and Fig. 6 shows the combined air cards. The several values found in the test are tabulated below:

Initial steam pressure (gage)	130 lb.
Terminal air pressure (from card)	81 lb.
Vacuum	18 in.
M.e.p. (low pressure steam cyl.)	28.7 lb.
I.h.p. (high pressure steam cyl.)	60 h.p.
M.e.p. (high pressure steam cyl.)	64.3 lb.
I.h.p. (high pressure steam cyl)	64.3 lb.
Total i.h.p. (steam end)	144.2 h.p.
Ratio, v to V (Fig. 3)	1 to 1.6
M.e.p. (low pressure air cyl.)	17.8 lb.
I.h.p. (low pressure air cyl.)	84.2 h.p.
M.e.p. (high pressure air cyl.)	33.4 lb.
I.h.p. (high pressure air cyl.)	56 h.p.
Total I.h.p. (air end)	140.2 h.p.
Ratio, v to V. (Fig. 6)	1 to 2.82
Mechanical efficiency	96.9%
Water consumption (from cards),	18 lb. per h.p. hour.
Equivalent practical water consumption	21-22 lb. per h.p. hour.

The French Government is at present studying the formation of a set of rules and regulations governing the application of electricity to mines. The present laws on this subject are imperfect.

Dry-Air Blast.

In further support of James Gayley's thesis that a blast of dried air in the iron furnace will produce a marked economy in fuel, C. A. Meissner, at the recent meeting of the American Institute of Mining Engineers, presented the results of later tests at the Isabella furnaces, extending over a period of two years.

His observations indicated that the saving of fuel (about 20 per cent.) from drying the blast, is no less considerable during the winter months, when the atmosphere is naturally driest, than during the summer. Replying to the European criticism that the same results could be attained by adding to the burden of the furnaces while at the same time increasing the blast pressure, Mr. Meissner considered such treatment incapable of causing concurrently a saving of 20 per cent. in fuel and an increase of 20 per cent. in yield of iron. The text of his discussion is not yet in type, but throughout it, Mr. Meissner emphasized the belief that dried air exerts its influence toward economy of fuel, not so much through its freedom from moisture, the dissipation of which would absorb heat energy, as through the uninformity of its moisture contents, whereby the amount of fuel, in excess of theoretical requirements (that ordinarily has to be carried as a precaution against violent atmospheric fluctuations) can be dispensed with. Thus, the saving of fuel arising alone from the desiccated condition of an air blast can readily be computed at not above 3 per cent. whereas, as a matter of practical observation, the saving does reach 2 per cent., blast pressure, temperature and volume remaining the same as with undried air.

To Prof. H. M. Howe, the pointing out of this uniformity appeared to be an explanation which did not explain the apparently incommensurate results of the removal of water in such insignificant quantities. He brought forward the theory of critical temperature as pointing out the true reason. This theory maintains that furnace temperature has more influence upon yield than the amount of heat; that only that heat is effective in causing furnace reactions which is applied at a temperature above this critical point. In the iron blast-furnace this critical temperature is so high that only a narrow range exists between it and the usual working temperature above it; any fluctuation in the furnace temperature above the critical point magnifies greatly, therefore, the corresponding variation in heat effect.

Prof. J. W. Richards explained the apparent discrepancy between the 3 per cent. computed saving from desiccating the air, and the 20 per cent. actual saving, by the following line of reasoning: It is an observed fact that with dry blast the percentage of CO_2 in the escaping gases is higher than with common blast, denoting a more perfect combustion and a consequent economy of fuel. The radiation of heat from a furnace is independent of the yield, and is, therefore, less per ton of iron when the yield is larger, as it is with dry blast. It is noted that the gases from a dry-blast furnace escape at a lower temperature than from one using ordinary blast. These points at which heat is saved may be tabulated thus, in percentage of economy over the ordinary blast:

Absence of water from blast	3.0
More perfect combustion	6.9
Less radiation per ton iron	3.7
Cooler escaping temperature	5.3
	18.9

A slight additional source of economy, of unknown importance, arises in a reduced flow of slag, the heat in which has to be wasted.

Mr. Gayley then outlined the development of his refrigerating chamber, showing that the necessity for thawing the snow from the cold coils in the earlier, undivided chamber sent a large quantity of moisture back into the blast-air, leading to sharp irregularities; that this evil was overcome by sectionalizing the cooling apartment, so as to isolate temporarily the section to be thawed; and that the cooling and desiccating of the blast air are now acomplished in two stages. In the first cooling, about 6 per cent. of the moisture is condensed as water, leaving ouly the remainder to be chilled to the freezing point. This method saves 5 per cent. in operating expense and 20 per cent. in cost of installation.

The Iodometric Method of Copper Assaying.

BY EDMUND H. MILLER.*

I have made the following experiments in order to answer some points on the precipitation of copper, as usually practiced in the iodomteric method:

A. To 50 c.c. of copper sulphate solution (containing 0.1216 gram of copper), 5 c.c. of conc. H_2SO_4 and 150 c.c. of water were added; then aluminum foil, and the whole was boiled for 50 min. The deposited copper was of good color; the filtrate gave no coloration with H_2S.

A[1]. The same experiment, except that the time of boiling was 25 min.; the same result; no color with H_2S.

B. The same as *A*, with 10 grams of $(NH_4)_2SO_4$ in addition; boiled 55 min.; the copper was bright but deposited more slowly. No color with H_2S.

C. Same as *A*, with 10 grams of NH_4NO_3 in addition; boiled 1 hour and 10 min. Precipitation very incomplete.

D. Same as *A*, with 10 grams of NH_4Cl in addition; the action was very violent; the copper dark and spongy,

*Columbia University, New York.

After boiling for 10 min., the filtrate gave no color with H_2S.

I have used the method of precipitating copper by aluminum foil in analytical work for years, and have always found it complete when properly carried out; of course nitrates must be absent. Though I felt certain of the result, yet I had the experiments made because I did not remember that I had not actually tested filtrates by H_2S. The action of NH_4Cl (and that of other chlorides probably) is interesting, and seems to be in line with the solubility of aluminum in HCl.

The Ely, Nevada, Smelter.

The Nevada Consolidated Copper Company, San Francisco, has in process of construction, near Ely, Nevada, a 1,000-ton concentrating, roasting and smelting plant.

The new works when completed, will constitute one of the most carefully equipped and thoroughly modern plants in the United States. It is intended to produce blister copper; and the process of treatment will consist in concentration of the ore, roasting in McDougal furnaces, matting in reverberatory furnaces and bessemerizing. The machinery, much of which is of special and unusually heavy design, aggregates 11,400 tons in weight.

One of the features of the equipment will be a battery of six McDougal furnaces, each standing 19 ft. 6 in. high and 18 ft. in diameter. The main shafting for the entire group of six furnaces will be driven from a 20-hp. Bullock induction motor, running at 850 r. p. m. The operator will be enabled to control the operation of each furnace from any one of three floors or stages about them.

The concentrating machinery will include six 6-ft. Huntington mills, of the Anaconda type. They will be equipped with a special step box and with a continuous shaft for three mills, dividing the six mills into two groups. Two Blake crushers, eight Overstrom tables, 91 vanners, and 24 Richards classifiers are also to be installed.

The power house equipment consists of two 22 and 48x48-in. compound condensing engines, a 16x32-in. blowing engine with a capacity of 6,000 cu.ft. of free air per min.; and two 800-kw. Allis-Chalmers-Bullock engine type alternators, with two exciters. Seven motors, ranging from 20 to 100 h.p. are provided for the operation of various ore machinery, furnaces, etc.

Thomas W. Cox is engineer for the company and the entire contract is in the hands of the Allis-Chalmers Company, of Milwaukee, Wis. It is expected that the new plant will be ready to begin operations during the coming summer.

The blast for transformer cooling is usually delivered at ¾ to 1 oz. pressure.

The Cement Industry of Ontario.*

BY PHILLIPS THOMPSON.

The growing importance of the cement industry is recognized by an article on the subject by P. Gillespie. Dealing with marl and clay, he points out that there is little danger of a dearth of supply for many years to come. In order to procure the lime used in portland cement, all the plants in Ontario, with one exception, use marl; while in the United States only 16 per cent. of the cement output is made from that material. Marl is found at the bottom of a number of comparatively small and shallow lakes, those in eastern Ontario are not being exploited at the present time. Among these deposits are a large one in Storrington township, 10 miles north of Kingston, the beds in Lake Longboro, other lakes near Belleville, and some considerable areas in Renfrew county. A deposit has also beeen recenly found in Emerald lake, near Timiskaming, New Ontario. As a matter of fact, most of the cement plants in operation are situated in the western peninsula of Ontario, especially in the district near Owen Sound.

In the production of cement, out of 100 lb. dredged material from the marl beds, only 18 lb. enters into the finished product. As a barrel of cement requires 220½ lb. of lime for its manufacture, this calls for 1,300 lb. of wet marl, or at an outside estimate, 0.52 cubic yard. A plant of 300 bbl. capacity would consume 156 cu. yards per day. As 100 acres 15 ft. deep will contain 2,420,000 cu. ft. of marl, such a deposit would furnish a quantity sufficient to last for 50 years at the present rate of consumption. The silica and alumina required are supplied by clay or shale, the silica occurring in "soluble" form and not as granules of sand. Hence clay that is gritty to the touch is objectionable. The best clays for the purpose are those which have a greasy feeling. Any which impart a stain to the fingers are unsuitable, as likely to be impregnated with iron or organic matter; those containing much calcium carbonate should also be avoided. The cost of a modern cement plant is estimated at $50,000 per rotary-kiln, including all equipment for dredging and transporting material suitable for buildings and power appliances. Experience has shown that the highest profits are realized by plants having the greatest capacity. The expansion of the industry is shown by the increase in output, from 695,260 bbl. in 1903, to 880,871 bbl. in 1904; though owing to a reduction in price (from $1.70 to $1.40 per bbl.), the value has not increased proportionately, being $1,239,971 as compared with $1,182,799 in 1903. This shows a healthy increase.

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*Note from Fourteenth Report of Ontario Bureau of Mines, 1905.

Errata.

In the article on "Progress in Gold Ore Treatment During 1905," by Alfred James, which appeared in our issue of Jan. 6, certain unfortunate errors occurred which require correction. An error in proof-reading caused the statement that the reduction in cost at the Knights Deep mine by the use of tube mills was only 1s. 10d. per ton, whereas the sentence should have read: "The Knights Deep has increased its output by no less than 35%, using three tube-mills per 100 stamps, with a reduction in costs over milling the same quantity by stamps only (using 50 extra stamps) of 1s. 10d. per ton." In the concluding paragraph of the article the statement that the Elmore process is "copied from" the floating off of metallic particles by means of gas bubbles, etc., should have read "based on" instead of "copied from," which was due to an error of the copy-reader.

In the article on "West Australian Gold Mining in 1905," by H. C. Hoover, an error of the typewriter, who copied the MS caused it to be said that the nominal capital of the companies quoted on the Western Australian market was £9,500,000 and the market value of the same was £29,-500,000, whereas the figures should have been £5,320,000 and £15,670,000, respectively.

Ontario Mining Law.

The new mining bill to be introduced in the Ontario Legislature by Hon. Frank Cochrane provides for the creation of several new mining divisions. At present there are only two, viz., Michipicoten and Timiskaming, the latter including the Cobalt area. A recording office will be located in each division, at which all applications for claims must be filed. At present all applications for claims outside of the existing mining divisions have to be filed in Toronto, which has caused much inconvenience and confusion. The area of claims will be 40 acres and the price per acre for the patent will be $2.50 or $3 in surveyed districts and probably $2 in unsurveyed territory. There will be no royalty or percentage on the output of the mines, but a uniform tax will be levied on the land of 7c. or 10c. per acre. The land will be sold subject to working conditions, in order to prevent claims being taken up for purely speculative purposes. Provision will be made for aiding by bonuses or bounties the refining of nickel and hilver-cobalt ores in Ontarno. The bill has been carefully prepared. and will meet little opposition.

According to *The Engineering Record* (Feb. 10, 1906, p. 145), acetylene gas for welding steel and iron has been used with success in Italy, the resultant heats considerably exceeding those of the oxyhydrogen flame. The gas is mixed with air in the burner in a similar manner to that used for the oxhydrogen flame.

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*Illustrated.

The Anthracite Operators and the Open Shop.

The most important part of the reply of the anthracite coal operators to the representatives of the workmen is their declaration for the open shop.

They say "We stand unalterably for the *open shop.*"

This is in line with the position already taken by us, which will be followed, we are confident, more and more by the employers of labor. The same fundamental principle was proclaimed in the report of the Anthracite Coal Strike Commission to President Roosevelt on March 18, 1903. It was the demand for the closed shop which was the real animus of the strike of 1902, and it is the same which determines the present situation between the anthracite operators and their workmen. In standing out for the open shop, the operators will occupy a position which is impregnable. This is a broad principle of management, which is quite distinct from the details involved by the other demands of the miners.

In making the demand that the companies not only recognize the union, but become its agent to the extent of deducting from each man's wages the amount of his dues to the union, Mr. Mitchell made a grave mistake, and the reply of the operators that compliance to this demand would be contrary to the laws of Pennsylvania is conclusive. This demand of the miners was furthermore a mistake in disclosing the fear of the managers of the union that its members may cease to care enough for it to support it, thus, in effect, asking the operators to agree to and execute what would practically be compulsory membership. The logical deduction is consequently that that union is intended to be run rather for the benefit of its management than for that of the workmen, whom it is supposed to represent. This demand is simply preposterous.

With respect to the details of administration, such as adjustment of grievances, hours of labor, wages, and weighing, the operators make out a strong case. It is pointed out that the miners already work no more than eight hours, that wages now average higher per annum than in most similar industries, that the reduction of working time in the breakers would largely increase the cost of production, not only through the payment of nine hours' wage for eight hours' work, but also through the reduction in capacity of the expensive machinery and plant, which would be idle an additional hour per day, during which time they would fail to produce a return on the large capital invested. These statements and arguments are convincing.

The increase in wages which the miners received three years ago has been paid by the public. A further increase in wages now would also have to be paid by the public. It is always the public which pays. The public generally appreciates this situation, and its sentiments will be on the side of the operators. There are no conditions which have arisen during the last three years, which have shown that the decision of the Anthracite Strike Commission was unjust; if there was any injustice in it, it was to the operators, not to the miners. If there be any question as to this, or as to change in conditions, let the commission be called together again.

It appears probable now that there will be a strike in the anthracite field unless some such expedient be resorted to. If, however, there must be a strike, the intelligence and honesty of the law-abiding American citizens will be unwaveringly on the side of the anthracite operators in their declaration for the open shop and the upholding of this broad principle of freedom.

Benefits of Gold Dredging.

In previous issues we have referred to the opposition to gold dredging which has been increasing with the expansion of this young but flourishing industry; we have explained its causes, and suggested the remedies. It is extremely gratifying to note, particularly, the benefits which intelligent and unselfish operation is accomplishing in a region where, more than in any other in the world, the effects of mining have been most harmful to other interests when only the actual physical results are viewed. We refer to the dredging operations in the Yuba river, California.

Hydraulic mining was done on the largest scale, and with consequent greatest deposition of tailing where physiographic features conduced to its rapid transportation into the lower reaches of the river, filling the bed and spreading

over the low-lying agricultural and horticultural area on the banks. Hostility was aroused and the Anti-Debris Association had numerous and active members in the Yuba district where, in some instances, the river bed is now over 10 ft. above the level of the surrounding farms. Levees, costly of installation and maintenance, give these areas an expensive protection, hazardous and insecure at best.

A part of the plan, as formulated by the Debris Commission, for rectifying the bad conditions on the Yuba, includes the construction of a wall, or embankment, which will turn the river into a low-lying settling basin where the earthy material in suspension will be deposited, the water having then practically no velocity. At one time it was thought that it would be necessary to allot a considerable sum for the construction of this wall, which is 200 to 300 ft. wide at the base, about 30 ft. high and will be about 2.5 miles long when completed. About 0.5 mile has already been built by two dredges; six more now under construction, will make for its early completion. This work is being done by the dredging corporation without cost to the Debris Commission and its funds are available for other branches of the work.

This is interesting: hydraulic miners *have* done damage; dredge miners are *repairing* this damage. Both hydraulic and dredge miners will confer tremendous good, when the plan for beneficent resumption of hydraulic mining shall have been consummated, and when a more general practice of the above-noted policy by other dredgemen shall have eliminated all cause of opposition. The marvelous possibilities which will result when the hydraulic miners are not only producing millions per year, but also (as is contemplated in the proposed plan for rehabilitation) are sending large volumes of life-giving water and enriching material to farms which are sterile because of insufficient rain or barren by reason of too intensive cultivation. Immense waste areas, now marshy and submerged during the annual floods, will be reclaimed by filling, and made to contribute to great agricultural and horticultural prosperity where by reason of unfortunate topographic features, unfavorable meteorologic conditions, and too intensive cultivation, little is now grown and land has low value. Dredgemen are aiding the farmers and miners by their procedure on the Yuba, and all tends toward a reconciliation between farmers and miners.

A spirit of amity, with a common plan and united purpose, means much to California. It is, in fact, the one indispensable condition. Although the problem is a large one, and though there are engineering, economic and other phases of magnitude, yet these are, by comparison, small when compared with the chaotic conditions due to the existing hostility—an insurmountable barrier to real progress. All that is needed is a friendly feeling; a united effort by all interested will accomplish results that are pregnant with colossal possibilities.

The Ontario Mining Laws.

The widespread dissatisfaction with the mining laws of the new nickel-silver fields in Northern Ontario has resulted in a strong movement to have them amended. The recent conference of mining men at Toronto, which was summoned by the Provincial Government of Ontario, discussed a wide range of practical subjects; the most important problems considered being: (1) Mining royalties; (2) opening of Crown lands to miners; (3) location of claims without discovery of mineral thereon; (4) working conditions relating to mining leases. These are all matters of prime importance to the mining men of the Province, and it should be said to their credit, that in the conference they considered them in an intelligent manner.

The first proposal was almost unanimously voted down. The payment of royalties to the Crown found no champion. The majority in the conference fully appreciated the hardship inflicted on mining whenever royalties are imposed. Experience has shown that they always tend to increase rapidly, and are practically harmful in new mineral districts.

The conference was fully agreed as to the necessity of the Government throwing all Crown lands open for prospecting. The Government should go even farther than this, and reserve all mineral rights in every parcel of land alienated. This would thoroughly safeguard mining rights, and ultimately it would benefit the Province to the fullest possible extent; it would also result in the prevention of a monopolizing of valuable tracts.

There was a strong divergence of opinion regarding the resolution proposing: "That any licensee may stake out a location without first making a discovery of mineral thereon." Mining men and prospectors declared strongly in favor of the resolution; but the mining promoters and investors present bitterly opposed it. This matter has been fought out, time and again, in the United States. The unanimous opinion of mining men, however, now is in favor of the granting of firm titles to all claims applied for, providing the proper assessment and labor conditions are duly observed. The unanimity of feeling on this subject prevailing throughout American mining circles may influence the Provincial Government of Ontario, perhaps to the adoption of the principle. In all mining fields, it is essential for prospectors to have some title for their claims in order to justify them in undertaking expensive developments; many mineral veins do not outcrop on the surface, and the old regulations framed in the interest of locators of veins outcropping only are now archaic.

The conference expressed itself in favor of the granting of claim patents after the expenditure of $100 in actual mining work on the year of location, and the same sum in each of three years immediately following. This is a reasonable proposition. It has been suggested as an alternative for this, that a fixed rental be placed upon all mining claims, and the amount be remitted on proof of an equivalent amount of development work.

The most essential principles in any mining law are those relating to the acquirement of title and the prevention of the locking up of mineral lands. The most effective methods of doing this have been demonstrated to be: The State reservation of minerals in all land titles; the leasing of mineral lands for fixed periods (with right of renewal for similar periods indefinitely), with effective clauses revoking the leases only on a failure to fulfil the necessary development work. It is possible that the Provincial Parliament of Ontario is not at present in a position to adopt fully these principles; but it has an excellent opportunity for framing its amendment laws so as to approximate the best practice. Its actions in regard to the speedy remedy of the abuses under the existing mining laws will be followed with interest, particularly in other States where the revision and modernization of mining laws are highly desirable.

Mineral Production of Canada.

The Mines Department of the Geological Survey of Canada has completed the preliminary statement of the mineral production of the Dominion for the year 1905. The figures which are given herewith are subject to a few final corrections, but are generally a very close approximation to the actual results. Much credit is due to E. D. Ingall, the head of the Mines Department, for this prompt collection and presentation of the results. The tons used in the table are short tons of 2000 lb. each, in all cases.

Of the gold reported in 1905, a total of $8,327,200 was from the Yukon Territory; the balance of $6,159,633 being from other provinces. The pig iron given is only that made from Canadian ores. In addition, 457,378 tons were made from ores imported from Newfoundland and the United States; making a total of 527,932 short tons made in Canadian furnaces. In the case of the other metals, the totals include the metallic contents of ores and matte exported.

The total value is the largest ever reported. It is $8,500,810 greater than that for 1904; and $2,235,549 greater than 1901—previously the year of greatest production—when the total was swelled by the first rush of gold from the Yukon. The only considerable decrease last year was of 12 per cent. in gold. The marked gains were in lead, copper, nickel and silver.

Coal is now the first product in value, being 25.8 per cent. of the total; gold is second, with 21.1 per cent. Nickel and copper furnished, respectively, 11 and 10.8 per cent. of the total. Coal and the metallic products together form 80 per cent. of the total.

The total values for 20 years past have been as follows:

1905	$68,574,707	1895	$20,648,964
1904	60,073,897	1894	19,931,158
1903	62,600,434	1893	20,035,082
1902	63,885,999	1892	16,623,417
1901	66,339,158	1891	18,976,616
1900	64,618,268	1890	16,763,353
1899	49,584,027	1889	14,013,113
1898	38,697,021	1888	12 518,894
1897	28,661,430	1887	11.321,231
1896	22,584,513	1886	10,221,255

It is to be noted that the Survey has allowed nothing in the table for the zinc ores mined in British Columbia, and does not give the quantity exported from that province. The Customs Department, also, does not specify such imports, but they are included under the head of metals, not otherwise provided for. Reference, however, is made to zinc in the comments appended. We give below the detailed remarks of the department on the more important branches of the production:

Gold—The gold-producing industries of all the provinces show an encouraging increase in comparison with previous years. The largest contributor, as for several years past, has been the Yukon Territory, which is to be credited with over 57 per cent.; British Columbia coming next with nearly 40 per cent. Nova Scotia and Ontario together with a little from Quebec and Alberta, completed the remainder of a little under 3 per cent. necessary to make up the total.

In Nova Scotia there was slight recovery from the general decrease in the production, which has been apparent for a number of years. The explanation would seem to lie in the fact that the immediately accessible surface ores of most of the districts have been mostly worked out, and the revival of the industry will depend upon the inauguration of a radically different policy to that which has been followed so far. It is believed that consolidation of many of the numerous smaller mines and the inauguration of new methods and plant suitable for the economical mining of ore from greater depths, will lead to renewed activity. As these matters seem to be receiving serious attention, a revival of the industry is looked for.

In Ontario, activity was evident in prospecting and developing at numerous points both in the old districts in the eastern parts of the province and in the newer gold-bearing districts west of Thunder Bay.

In British Columbia, a dry season is said to have affected the production of placer gold, but as a whole the industry is about as last year.

The output of the Yukon Territory placers continued to fall off as expected and will probably continue until under favorable conditions the more permanent forms of mining of the lower-grade bodies of gravels are fully established.

Silver—For a considerable time now, the production of silver has been nearly altogether accounted for by the silver contents of the various ores of other metal mined and treated in British Columbia. This province furnished 90 per cent. of the metal during 1905. Owing, however, to the discovery and working of the exceedingly rich silver-cobalt-nickel ores near the northern end of Lake Timiskaming in Ontario, that province has suddenly attained almost to an equality with British Columbia and between them they now furnish over 98 per cent. of the total output.

The shipments made so far from the silver camp at Cobalt, Ont., have been to smelters, chiefly in the United States. The results have not apparently been satisfactory to the shippers, and efforts are being made toward the erection of smelters to treat the ores locally. At Copper Cliff the Canadian Copper Company has already erected a plant capable of partially treating these ores with elimination of the excess of arsenic.

The silver occurs mostly in the metallic condition and although the veins worked are small, being measured in inches of thickness instead of feet, the silver values are so high that although only in the second year of its existence, the aggregate value of the shipments has been extraordinary, especially in view of the comparatively limited amount of the development work done. Carloads of ore reported at from $60,000 to $100,000 in value have not been unusual. For the first six months of 1905, official figures give the shipments as 891 tons, aggregating $688,004, or a little over $772 per ton. These results, it is important to consider, were due to the work carried on at some six mines in a camp the existence of which dated only from the previous fall.

A recent bulletin, issued by the Geological Survey, draws attention to another most important and recent discovery on the west side of Windy Arm, a southerly branch of Lake Tagish. This is situated in the southwesterly part of the Yukon Territory and is the more important as it is easily reached from the White Pass & Yukon railway. The report describes the veins as strong, persistent, and already traced for considerable distances. The widths mentioned are of from 1 to 5

MINERAL PRODUCTION OF CANADA IN 1905.

Product.	Quantity.	Value.
METALLIC.		
Copper ..... Lb.	47,597,502	$ 7,420,451
Gold ..... "	.....	14,486,883
Iron ore (exports, est). Ton	116,779	125,119
Pig iron from Canadian ore ..... "	70,554	1,047,860
Lead ..... Lb	55,961,000	2,634,084
Nickel ..... "	18,876,315	7,550,526
Silver ..... Oz.	5,971,878	3,605,957
Cobalt	.....	100,000
Other metallic products, including zinc	.....	180,000
Total metallic	.....	$37,150,830
NON-METALLIC.		
Asbestos ..... Short ton.	50,670	$ 1,486,359
Asbestic ..... "	17,594	16,900
Chromite ..... "	8,577	93,301
Coal ..... "	8,775,933	17,658,615
Corundum ..... "	1,644	149,153
Felspar ..... "	11,700	23,400
Graphite ..... "	541	17 032
Grindstones ..... "	5,172	57,200
Gypsum ..... "	435, 89	581,543
Limestone for flux in iron furnaces "	341,614	258,759
Manganese ore (exports) ..... "	2.	1,720
Mica ..... "	.....	168,043
Mineral pigments—		
Barytes ..... "	3 360	7,500
Ochres ..... "	5,105	34.675
Mineral water	.....	100,000
Natural gas	.....	3 4,249
Petroleum ..... Bbl	634,095	849,687
Phosphate ..... Ton	1,3 6	8,425
Pyrites ..... "	32,744	123,574
Salt ..... "	45,370	310,858
Talc ..... "	500	1,800
Tripolite ..... "	200	3,600
Total non-metallic	.....	$22,266,593
STRUCTURAL MATERIALS AND CLAY PRODUCTS.		
Cement, natural rock .. Bbl.	14,184	$10,274
" Portland ..... "	1,346,547	1,913,740
Flagstones	.....	7,650
Granite	.....	209,555
Sands and gravels (exports) Tons	366,935	152,805
Sewer pipe	.....	382,000
Slate	.....	21,568
Terra-cotta, fire proofing, etc.		64,892
Building material, incl'd'ng bricks, building stone, lime, etc	.....	6,095,000
Total structural materials and clay products	.....	$8,857,484
Estimated value of mineral products not returned	.....	300,000
Total, 1905	.....	$68,574,707

ft. in one case, up to 9 ft. in another. The minerals contained are native silver, argentite, stephanite, freibergite, pyrargyrite, galena, tetrahedrite, chalcopyrite, native copper, malachite, azurite, iron pyrite, arsenopyrite, pyrrhotite and sphalerite. The antimonial and arsenical silver minerals seem to be the most common form of occurrence of that metal. The main values are in silver and gold.

In British Columbia, considerable quantities of fine silver and of base bullion and other products carrying the metal are produced at the Trail smelter.

Cobalt—Mention has already been made in connection with silver of the discoveries of cobalt ores in the northwestern part of Ontario. While the great richness in silver of these deposits is the feature giving them their great importance, the occurrence of these arsenide ores of cobalt is of great interest. Unfortunately, the supply thus rendered available has proved too great for the consumption at present, but it is hoped that this very abundance will lead to new uses being found for this metal and to its becoming later a valuable asset.

Copper—In the production of this metal, British Columbia still retains the pre-eminence. In 1904, the province was credited with over 80 per cent. of the whole, and although still maintaining a very long lead, increased production both in Ontario and Quebec has considerably reduced that held by the western province.

The copper of Quebec still represents the content of the pyritous ores mined for so long a period of years; while the Ontario output is, as formerly, produced in operating the nickel and copper ores of Sudbury. A number of small mines are worked upon deposits of chalcopyrite and the recent change of ownership of the Bruce mines would seem to promise the early re-entry of these old mines into the field of activity. So far, however, the Sudbury mines must be credited with the bulk of the results.

In British Columbia, the figures show a continued increase in the output of copper-bearing products. In 1904, the Boundary district produced over 61 per cent.; the Rossland camp about 20 per cent.; the Coast district over 16 per cent., the remaining approximation (3 per cent.) being derived from Yale, Kamloops, Nelson and various other districts. It is locally estimated that the Boundary district increased its output by probably $1,000,000, the other districts remaining practically stationary or showing slight falling off, so that the prominence of the first-named camp must have been considerably increased.

The increase in the total value of the output of copper for the Dominion has been greatly enhanced by the rise in the average price of the metal of about 3 cents.

Iron—About 116,779 short tons of iron ore, being a part of the output of the Helen mine at Michipicoten, were exported during 1905. In addition to the ore exported, about 173,171 tons or ore were mined in Canada and charged to Canadian blast furnaces.

Besides the above Canadian ore, 861,847 tons of imported ore, valued at the furnaces at $1,168,420, were used in Canadian furnaces. The total amount of pig iron manufactured from both Canadian and imported ores was 527,932 tons valued at $6,492,972 as compared with 303,454 tons valued at $3,582,001 in 1904.

The total amount of bounty paid on iron and steel by the Dominion Government during the calendar year 1905 was $1,900,206.

Although the production of pig iron from Canadian ores only does not show a very large growth, the industry as a whole shows large proportional advancement and new furnaces at several points are contemplated or in course of construction. With the new iron-ore districts more recently brought to light and the greater accessibility of many discovered in past years, the home ore-mining industry promises to take a far more prominent and fitting position.

Lead—Assisted by the Dominion bounty, lead production again shows a large increase, nearly 50 per cent. more lead being produced in 1905 than in the previous years. The production in 1905 was approximately 27,980 tons as compared with 18,765 tons in 1904.

The total amount paid in bounties during the calendar year 1905 was $334,224. The payment of bounty on lead in ore exported to Europe ceased on June 30, and owing to the rise in the price of lead, the rate of bounty payable in other cases was gradually diminished and all payments ceased in November, when the price of lead in London reached £16 per long ton.

Exports of lead in ore according to customs returns, were 7,284 tons to the United States and 20,175 to other countries; exports of pig lead were 21 tons to the United States and 632 tons to other countries, or a total export of lead of 20,852 tons.

The Canadian Smelting Works at Trail, B. C., has had an electrolytic lead refinery in operation. At the present time, about 50 tons per day are being treated, and lead is being supplied to the corroding works recently established by the Carter White Lead Company of Canada, at Montreal. This latter plant is equipped with machinery for an immediate capacity of 7,000 tons per annum, but is designed for an ultimate capacity of 15,000 tons and will use Trail lead exclusively.

Nickel—The following were the aggregate results of operations on the nickel-copper deposits of Ontario in 1905 in short tons.

	Tons.
Ore mined	277,766
Ore smelted	251,421
Matte produced	17,388
Matte shipped	17,405
Matte in stock at end of year	2,675
Copper contents of matte shipped	4,386
Nickel contents of matte shipped	9,438
Value of matte shipped	$4,019,814

According to customs returns, exports of nickel in matte, etc., were for the twelve months ending Dec. 31, as follows: To Great Britain, 1,281,594 lb.; United States, 16,036,485 lb.; total 17,318,059 lb.

The price of refined nickel remained fairly steady throughout the year. Some of the ores from the now famous Cobalt district contain from 4 to 7 per cent. of nickel in addition to the silver, cobalt and arsenic, but no statistics of production of nickel from this district have been included in the table of production.

Zinc—The zinc ores of British Columbia, which were formerly regarded as merely detrimental constituents of the combined lead and zinc sulphuret ores of the province, have for some time been the subject of great interest on account of the demand which has recently arisen for ores of this metal. Already attention has been turned toward utilizing the zinc blende associated with the argentiferous galena of the various camps in east and west Kootenay. Mill practice has been altered at some of the mines already operating so as to give a satisfactory separate zinc product, and attention is also being turned toward the opening up of various claims where the large proportion of blende present had formerly debarred profitable work.

The recently erected smelter at Frank, in the southern part of the province of Alberta, is owned by the Canadian Metal Company. In the course of time this may prove to be a factor of some importance in the situation with regard to these ores.

The whole question of supply and utilization of these ores is now under investigation by a commission instituted by the Federal Government.

Coal—The coal output represents the result of operations in the old-established fields of Nova Scotia and on Vancouver Island, British Columbia, as well as in the comparatively recently opened districts of southeast Kootenay and southwestern Alberta. Smaller amounts have been contributed by a number of operators at various points throughout the provinces of Alberta and Saskatchewan, as well as from New Brunswick and Yukon Territory. The whole industry shows an increase of about 6 per cent. as compared with 1904.

The different provinces contributed to to total as follows: Nova Scotia over 60 per cent.; British Columbia nearly 20 per cent.; the remainder being attributed to the other districts before mentioned. In

all districts the output showed an increase over that for 1904.

Natural Gas and Petroleum—Prospecting for these minerals has been very active and word comes from numerous points from all over Canada of test borings in progress, while in very many places the glowing newspaper reports are greatly exaggerated; still, the prospects as a whole are hopeful for finding these substances in paying quantities outside and far removed from the present well-established fields as well as for the extension of the known productive areas of these latter.

Asbestos—The production of asbestos, divided into crude and mill stock, was as follows:

	Tons.	Value.
Crude	3,768	$ 472,859
Mill stock	46,902	1,013,500
Total asbestos	50,670	$1,486,359
Asbestic	17,594	16,900
Total products	68,264	$1,503,259

Exports of asbestos, according to customs returns, were 47,031 tons, valued at $1,386,115. This industry continues much as usual, the two general features of interest being the very considerable increase in output and the promising discovery of long fiber of good quality in the Chibogamoo lake district, about 150 miles northwesterly from Lake St. John, in northern Quebec.

Cement—The production of natural rock cement, which in 1904 had decreased to 56,814 bbl., valued at $50,247, fell off in 1905 to the comparatively small amount of 14,184 bbl., valued at $10,274. This was made by three firms in Ontario. The production of portland cement, however, continues to increase steadily. Thirteen companies were operating plants during 1905 with a total daily capacity of about 8000 bbl.: one in Nova Scotia, two in Quebec, nine in Ontario and one in British Columbia, while another in Ontario was engaged in reconstruction work. Detailed statistics of production in 1904 and 1905 are as follows:

	1904.	1905.
Portland cement sold, bbl.	910,358	$1,346,548
" manuf'tured "	908,990	1,533,628
Stock on hand, Jan. 1, "	113,419	112,086
" Dec. 31, "	112,051	299,166
Value of cement sold	$1,287,992	$1,913,740

The average price per barrel at the works in 1905 was $1.42, being only a fraction of a cent higher than the average price in 1904.

The imports of portland cement into Canada in 1905 were 2,513,965 cwt. This is equivalent to 718,275 bbl. of 350 lb. each at an average price per barrel of $1.27. The duty is 12½c per 100 lb. This is a decrease of 66,355 barrels.

As there is very little cement exported from Canada, the consumption of this product in this country in 1905 would be approximately 1,346,548 bbl. of home product and 718,275 bbl. of imported, or a total of 2,064,823 barrels.

Exports of mineral products for 1905 are reported by the customs department as below:

Products.	Quantity	Value.
Arsenic, Lb.	108,000	$ 5,400
Asbestos, Ton	47,031	1,386,115
Barytes, Cwt.	34,488	14,342
Chromite, Ton	5,042	45,072
Coal, "	1,635,287	4,029,457
Feldspar, "	9,161	27,660
Gold bearing quartz, dust, nuggets, etc, $	.....	13,706 969
Gypsum, crude, Ton	359,246	388,474
Copper, fine in ore, etc, Lb.	40,470,879	5,461,490
" black or coarse, and in pigs, "	269,982	42,383
Lead in ore, etc, "	40,350,792	1,011,655
" pig, etc, "	1,306,611	34,886
Nickel, in ore, etc, "	17,318,059	1,569,693
Platinum, in ore concentrates, etc, Oz.	15	283
Silver in ore, etc, "	4,740,742	2,777,218
Mica, Lb.	1,087,781	170,049
Mineral pigments, "	707,247	7,704
" water, Gal.	4,173	2,137
Oil—		
Crude, "	35	2
Refined, "	7,228	2,078
Ores—		
Antimony, Ton	525	27,118
Iron, "	168,289	407,881
Manganese, "	22	1,720
Other ores, "	17,383	687,565
Phosphate, "	40	1,253
Plumbago, crude, Cwt.	5,088	7,596
Pyrites, Ton	19,755	55,767
Salt, Lb.	1,447,728	6 112
Sand and gravel, Ton	306,935	152,805
Stone, ornamental, "	2,878	898
" building, "	59,355	12,191
" for manufacture of grindstones, "	669	7,407
Other products of the mine	.....	71,331
Manufactures—		
Acid (sulphuric), Lb.	232,203	2.718
Bricks, M.	754	5,888
Aluminum in bars, etc, Lb.	2,535,386	508,219
Aluminum, manufactured	.....	1,558
Cement	.....	3,143
Clay	.....	35
Coke, Ton	116,071	509,908
Gr'dstones, manuf'tured	.....	17,461
Gypsum, ground	.....	2,673
Iron and steel, value	.....	1,287.558
Lime	.....	85,723
Metals, N. O. P.	.....	81.945
Plumbago, mfgs. of	.....	518
Stone ornamental	.....	3,107
" building	.....	438

The figure for iron ore is known to be too high, owing to a duplication in entries. At present correction is not possible.

The Canadian Mining Institute.

The annual meeting of the Canadian Mining Institute began at the Chateau Frontenac, in the city of Quebec, on March 7. The opening session was a business meeting. President George R. Smith delivered his annual address, in which he referred to the historic ground on which the meeting was held, and in this connection he dwelt at some length on the first beginning of the mining industry in Canada. After referring to the belief of the geologists that the spot upon which the meeting was held was probably the oldest land in the world, he said:

"Not many generations passed away after Champlain's founding of Quebec, before successful efforts were made by the pioneers of New France to wrest from the vitals of the earth the hidden wealth underlying, so contemptuously referred to at a later date by some of the attachés of the French Court.

"The distinguished French statesman, Colbert, who, like his royal master, Louis XV, was deeply interested in the progress and prosperity of New France, recognized not only the importance of retaining the fur trade of America in the hands of the French, but realized still more the desirability of the proper cultivation of the soil and the operation of mines. Less than three-score years after the founding of Quebec M. de la Tessiere. a French engineer who had been instructed by Colbert to explore the north bank of the lower St. Lawrence, discovered in 1666 the iron deposits of Baie St. Paul. The Intendant Talon was instructed by the Minister to carry on similar explorations in other parts of the country. It was under his auspices that the mineral wealth of the St. Maurice country, in the district where the Radnor forges were subsequently erected, was first brought to light.

"The French engineer, M. de la Potardiere, who was sent to Canada to inspect and report on these mines, failed to estimate justly the value and importance of the deposits in question, and of which we find early mention in the diary of the Ursulines of Three Rivers, and so their development was for some time delayed. Frontenac, however, in 1672, refers to them as of considerable importance. In this view he was corroborated by DeDenonville in 1681.

"The first company to develop these mines were formed in 1733, though it was not until some time later that they were placed in really successful operation.

"The St. Maurice forges in 1739 were described as an honor to Canada. The famous Swedish naturalist, Paul Kalm, who visited this country in 1749, spoke of them as quite as well equipped as those of his own country, and they found plenty of employment in smelting the ore and casting the product into stoves to heat the dwellings of the early Canadian settlers."

The president referred to the possibilities of the new regions in northwestern Quebec and northeastern Ontario, which are now being prospected for the first time. The explorations of Messrs. Obalski, Lowe, Hardman and others, give promise of much mineral value in those regions, and the construction of the new railroad through this section, which has now begun, will open the region for development.

Mr. Smith expressed regret at the absence through illness of the secretary of the Institute, and spoke in appreciation of the manner in which Dr. Porter had come to its assistance by taking up the arduous duties.

The report of the council was then presented, showing the Institute to be in good condition, with a total of 480 members, and a satisfactory financial position. The report was adopted:

A discussion arose over some irregularities in sending out the ballots for officers. This was finally settled by a compromise resolution offered by Mr. Hobart and unanimously adopted

Messrs. A. P. Lowe, F. Hobart and J. J. Penhale were elected scrutineers and

the ballots transferred to their keeping.

Invitations were received from the Ministry of Mines to take a trip on the ice-breaker "Montcalm," and from the Quebec Railway Company to visit Montmorency and Ste. Anne de Beaupré.

Among those present at the opening meeting were Professor Walker, Eugene Coste, E. T. Cirkell, T. L. Walker, S. Groves, G. R. Mickle, W. G. Miller, Toronto.

R. T. Hopper, Frank D. Adams, J. Bonsall Porter, John E. Hardman, A. Stansfield, J. A. Bancroft, Geo. LeCouteur, J. J. Penhale, A. W. G. Wilson, J. S. Brown, Geo. C. Tunstall, Montreal.

E. D. Ingall, A. P. Lowe, A. E. Barlow, A. M. Campbell, D. B. Dowling, Owen O'Sullivan, James White, Ottawa.

R. G. Leckie, Sudbury, Ont.

Hiram W. Hixon, Victoria Mines, Ont.

J. B. Tyrrell, Dawson City, Yukon.

Narabhai D. Daru, Surat, India.

Fred Hobart, Dr. James Douglas, New York.

A. B. Wilmott, Sault Ste. Marie, Ont.

Charles W. Dickson, Kingston.

J. W. Evans, Cobalt, Ont.

D. Gillies, Carleton Place.

A. McMeekin, E. E. Winter, L. H. Cole, McGill University, Montreal.

Mgr. Laflamme, J. Obalski, W. J. V. Atkinson, Jules Cote, Quebec.

Alfred Collier, R. A. Stinson and John S. MacLean, of Allis-Chalmers-Bullock, Limited, Montreal.

At the afternoon session on Wednesday, E. D. Ingall gave a brief summary of the production report of the Geological Survey. The report will be found on another page.

Prof. W. G. Miller, speaking for Ontario, said the output of that Province during the past year had been the largest ever reported, amounting in refined state to $23,000,000.

J. B. Tyrrell said that little could be added in regard to the Yukon as a gold mining camp. It had had its extreme boom days. While much of the surface gravel has been worked out, there is still much gold in the country. Conditions will have to change. The transportation problem was serious. The supply of water was also a problem. While the output fell off it was in part due to the scarcity of water almost as much as to the working out of the surface mining. Systematic development has not yet been undertaken. That country will yet produce a vast amount of gold, but most of it may have to lie fallow for some years until conditions change and costs of living and transportation become cheaper.

E. Coste, Toronto, said: There were enormous iron-ore ranges in Canada, and a united effort should be made in the development of our own industry. The Institute might consider the question of bounties on Canadian ores.

J. Obalski reported for Quebec. There had been a great increase in mineral production in this Province last year. Asbestos had been the main increase, amounting to about $2,000,000. Mica production amounted to $1,000,000, the total being $4,000,000. The cement industry was also being developed satisfactorily.

Papers were then read by Hiram M. Hixon on "The Ore Deposits and Geology of the Sudbury District"; by Dr. C. W. Dickson on "Genetic Relations of Nickel Copper Ores," and by J. Obalski on "Rare Earths in the Pegmatite of our Laurentian Range." These papers were followed by interesting discussions.

At the evening session the Chibogamoo region occupied a portion of the time, four interesting and instructive papers, all bearing more or less directly upon the subject, being contributed. The papers were: Notes sur un Depot de Pyrrhotine Nickelifere sur une pointe appellee Malachite Point," by A Muscovici ; "The Chibogamoo Mining Region," by John E. Hardman, Montreal; "The Chibogamoo Region," by A. P. Low, and "Probalité de Trouve des Mines au Nord de la Province de Quebec," by J. Obalski. These papers contained a large amount of information regarding the geological, mineral and other characteristics of the district, the paper of Mr. Hardman being illustrated by lantern views.

The remainder of the evening was devoted to the discussion of the necessity for the establishment of a Bureau of Mines by the Federal Government, the matter being brought before the meeting by the reading of two papers upon the subject, one the work of the secretary, H. Mortimer Lamb (read by the chairman) and the other by J. B. Tyrrell. The discussion resulted in the introduction of a motion by R. G. Leckie, seconded by J. B. Tyrrell, to the effect that the president and a delegation of the Institute proceed to Ottawa to interview the Government on the subject of meeting the needs of the mining men in this respect.

The meeting on Thursday morning was largely devoted to business which had been carried over from the preceding day. A discussion arose over certain portions of the council report, but the reports were finally approved and adopted in full. After the business had been disposed of, short abstracts of several papers were given, including one by Dr. Adams on the Topographical Survey, and one by Dr. Porter on the Education of Engineers.

In the afternoon the members, at the invitation of the Ministry of Marine and Fisheries, embarked on the ice-breaker "Montcalm." The boat went down the St. Lawrence as far as the Isle d'Orleans through heavy ice, and then through lighter ice up the river to St. Romuald and Cap Rouge, passing the point where the great cantilever bridge over the river is under construction. A collation was served on the boat. A brief meeting was also held on board, at which a number of papers were read by title.

In the evening the annual dinner of the Institute was held in the large assembly hall of the Chateau Frontenac. Besides the members, several invited guests were present. The toasts given were "The King," "The President of the United States," "The Province of Quebec," responded to by the Lieutenant-Governor, Sir Louis Jetté; "The Dominion Parliament," responded to by E. D. Ingall, of the Dominion Geological Survey; "The Quebec Legislature," by Hon. Jean Prevost, Minister of Mines and Lands, who gave a brief account of past mining in the Province, with a glowing anticipation of the new northern districts around lakes Abitibi and Chibogamoo; "Our Mineral Industries," proposed by Dr. F. D. Adams and responded to by F. Hobart, Hiram W. Hixon and Maj. R. G. Leckie; "Our Guests," Dr. James Douglas. After the conclusion of the formal speeches there were a number of informal speeches, songs, etc., and the occasion was much enjoyed.

On Friday morning a number of papers were read by title. Two striking papers were read in full—one on Laboratory Experiments in Electric Smelting of Titaniferous Iron Ores, by J. W. Evans; the other on the Utilization of Poorer Grades of Coal Slack, by D. B. Dowling. Both were discussed at some length.

At the opening of the afternoon session the scrutineers reported that they had duly canvassed the large number of ballots cast, and declared the following officers elected: President, Geo. R. Smith, Thetford Mines, Quebec. Vice-presidents to serve one year, Dr. F. D. Adams, Montreal, and Maj. R. G. Leckie, Temagami, Ont.; to serve two years, Frederic Keffer, Greenwood, B. C., and G. Herrick Duggan, Sydney, Cape Breton. Treasurer, J. Stevenson Brown, Montreal. Secretary, H. Mortimer Lamb, Montreal. Members of Council, to serve one year, John Blue, Eustis, Quebec, C. J. Coll, Stellarton, N. S., Thomas Cantley, New Glasgow, N. S., Frank B. Smith, Edmonton, Alberta, J. C. Gwillim, Kingston, Ont., R. J. McEvoy, Fernie, B. C., W. G. Miller, Toronto, Ont., and H. Williams, Danville, Quebec. To serve two years, W. H. Aldridge, Trail, B. C., B. A. C. Craig, Toronto, R. T. Hopper, Montreal, A. M. Hay, Rat Portage, Ont., Thomas Kiddie, Crofton, B. C., Dr. A. E. Barlow, Ottawa, Dr. J. Bonsall Porter, Montreal, and W. D. Robb, Amherst, Nova Scotia.

The president returned thanks for his re-election. Votes of thanks were passed for invitations received; also to Dr. Porter for his services as acting secretary in the absence of the secretary through illness.

An invitation from Arthur St. Jacques, Gentleman Usher of the Black Rod, on behalf of Hon. Mr. Archambault, to

attend the ceremony in connection with the prorogation of Parliament in the evening, was read by the president and accepted by the members.

Two interesting papers were read, one by R. W. Brock on the Rossland District, and one by R. G. McConnell on the Windy Arm Mining District. Mr. Brock's paper was illustrated by lantern slides.

A number of fine views in connection with the asbestos industry at Thetford mines were shown, as were a series of views taken by Dr. J. Bonsall Porter during a recent trip to South Africa.

After a few brief speeches the Institute adjourned until March, 1907; the place of meeting to be decided by the Council.

In the evening many members left the city, but a number attended the ceremonies at the Parliament House, where special attention was paid to the Institute. This closed a successful meeting.

The Anthracite Coal Controversy.

The anthracite coal companies, through their representatives, have refused the demands made by the United Mine Workers. The correspondence, as prepared in pamphlet form, gives first the preliminary letters, which have already been noted; then follows the agreement proposed by the miners, which consists of eight articles.

No. 1 prescribes that eight hours shall constitute a full working day, except in cases of emergency.

Nos. 2, 3 and 4 are schedules of wages for day-men, both inside and outside, providing generally for an increase over present wages.

No. 5 asks for an increase of 10 per cent. for all contract miners. Also for a standard size car for each colliery; for adjustments for each colliery and each vein, to be made jointly by a committee of employees, the district officers of the union and representatives of the operators. The present system of checkweighmen is to be continued.

No. 6 provides for a sliding scale, as at present. The wages agreed upon to be the minimum, with an increase of 1 per cent. for each advance in the price of coal of 5c.; $4.50 per ton at tidewater to be the base price.

No. 7 practically provides for the substitution of district boards for the present conciliation board. It outlines the system of reference to be adopted.

No. 8 contains a number of miscellaneous provisions, respecting "recognition of the union," the most important of which is the "check off"—that is, that the operator shall deduct from the pay-roll the amount due by each miner to the union.

The proposed agreement is elaborately drawn, and is much too long to be reproduced here in full.

The reply is signed by the operators' committee, consisting of George F. Baer, W. H. Truesdale, J. B. Kerr, David Willcox, Morris Williams, E. B. Thomas, and J. K. Cake, the last name representing the independent operators.

After rehearsing the conditions under the Anthracite Strike Commission's award, the letter classifies the miners' demands as follows:

1. An agreement for one year with the United Mine Workers of America, involving a wage scale, committee of miners at each colliery, and supervision by your district officers of our colliery operations.

2. Eight-hour day.

3. Uniform scale of wages throughout the regions.

4. An increase of 10 per cent. to men working under contract, and an additional 10 per cent. to all men using safety lamps. The practical results of demands 1, 3 and 4 will be an increase of 22.8 per cent. to all inside day labor, 29.7 per cent. to all outside men, and 16.2 per cent. to all contract labor, making an average increase as applied to the actual colliery workings of 21.64 per cent., equivalent to an increase of 33.68c. per ton on all sizes, or an increase of 51.8c. per ton on domestic coal, not including the sliding scale in excess of 1905; and adding the increase in wages created by the sliding scale, the cost to the consumer for domestic sizes will be increased $1.20 per ton, without a penny of increase in profit to the operator.

5. Weighing coal.

6. Check off. That is, the operators to deduct from pay of all employees and pay to your agents the sums your organization may name.

7. Abrogation of Board of Conciliation.

The letter goes at much length into the first proposition, rehearsing the Strike Commission awards and arguments; closing with this statement:

"We stand unalterably for the *open shop*, and again decline to make an agreement with the United Mine Workers of America, an organization controlled by a rival industry. The extent to which we are willing to go in making an agreement with the anthracite miners employed by us is shown by the proposition hereinafter made."

Reasons for objecting to the eight-hour day and the uniform rate of wages are set forth at length. Though forcibly presented, they do not contain much that has not been stated before. The letter then continues:

"3. Your schedule of wages as explained in your letter involves the old demand for a uniform scale of wages throughout the entire region. It is impracticable, by reason of the varying capacity of the workmen, and the varying conditions existing in the region and at the collieries, to establish any such uniform scale. Each colliery is a problem by itself. . . . .

"4. The proposition is to change the system of wages established by the Strike Commision by enormously increasing the amounts payable both absolutely and under the sliding scale. How this will work out is shown as follows:

"In the Schuylkill region the increased labor cost will amount to 21.64 per cent. The labor cost in the Lehigh region will show an increase of 26.85 per cent., and in the Wyoming region the increase will be less, averaging about 21 per cent. It is, therefore, fair to take the Schuylkill collieries as representing a general average.

The average labor cost of of the Schuylkill collieres, per ton, for the year ended Dec. 31, 1905, was $1.556; proposed increase of wages will amount to 21.64 per cent. or $0.3368; a total of $1.8928. This increase in wages applies to the total number of tons of coal mined of all sizes.

"Now, the steam sizes, because of competition with bituminous coal, cannot be advanced in price; therefore, the whole burden of increased cost must be borne by the domestic sizes, viz.: broken, egg, stove and chestnut. The proportion of domestic sizes to steam sizes varies at different collieries. At some collieries the steam sizes amount to 50 per cent. But taking the most favored collieries, and assuming that the domestic sizes amount to 65 per cent., and the steam sizes to 35 per cent., this will result in an increase of 51.8c. per ton on domestic sizes without the sliding scale.

"The increase which the sliding scale gives is based upon the total number of tons mined without regard to size, so that by the application of the sliding scale, the price of domestic sizes must be advanced $1.20 to compensate the operators for the total increase of wages to be paid.

"To illustrate: Take a total production of 10,000,000 tons, of which 6,500,000 tons are domestic sizes, and 3,500,000 tons steam sizes—the company, on an increase of $1.20 a ton (which, for reasons stated, could be applied only to domestic sizes), would receive in addition to what it now receives $6{,}500{,}000 \times \$1.20 = \$7{,}800{,}000$.

"It would, however, pay out in additional wages the following: On 10,000,000 tons, at the rate of increase per ton occasioned by the increased wages asked, $0.3368—$3,369,000; the operation of the sliding scale, by adding 1 per cent. to wages for every 5c. advance in price of coal, would add 24 per cent. to the new basis of wages, and this would be 24 per cent. of 1.89c. = 45c. a ton, and for 10,000,000 tons would amount to $4,500,000; a total of $7,869,000. The company thus paying out in wages $69,000 more than it would receive from the increased price of coal.

"The pay-rolls of our companies show that the employees are now being paid exceptionally high wages as compared with the wages paid to employees engaged in any like industry in this or any other country. There can be no room here for dispute.

"In the official report of George W.

Hartlein, secretary and treasurer of the Ninth district, and one of your committee, he shows that the company man is receiving per year 'a total of $650.41, or $298.91 more than what he received in 1899.' He also shows that the contract miner is earning per year '$883.10, or $443.72 more than he received in 1889.' . . . .

"5. In 1902 one of the demands made in behalf of the employees was that the existing methods should be changed and the coal should be paid for on a uniform basis of a ton of 2240 lb. No reason has ever been suggested why it is not quite as proper to pay by measure as by weight. After careful consideration of the matter the commission decided against the demand and refused to disturb existing conditions."

The "check-off," the operators claim, would be contrary to the laws of Pennsylvania, which require the payment of the *"full amount of wages or earnings in cash,"* with a single exception (which does not permit money to be deducted for such a general purpose). The operators' reply closes as follows:

"It is perhaps needless to remind you that wages cannot be fixed arbitrarily. They must be based upon the price at which the commodity produced can be sold at a reasonable profit on the capital invested. Few, if any, mining industries are carried on at so small a profit on the capital actually invested as is the operation of the anthracite coal mines.

"We believe that in general this covers your propositions, except that in so far as some of your minor demands are involved in the machinery of your proposed contract, and these necessarily fall with our declination to make any such contract.

"Your propositions as a whole, therefore, are declined.

"Our proposition is, that the awards made by the Anthracite Coal Strike Commission and the principles upon which they are established by the Commission, and the methods established for carrying out their findings and awards shall be continued for and during a further term of three years from April 1, 1906.

"It had been our hope and, we trusted, the public expectation as well, that the effect of the exhaustive investigation and findings of the distinguished citizens who constituted the Anthracite Strike Commission would be to establish a just and permanent adjustment of the relations between the operators and their employees. We therefore regret your suggestions that an entirely new and untried arrangement should be made, only to last for one year.

"It is not to the interest of employers or employees, nor of the public, to have the mining business, as well as the general business and comfort of the people, seriously disturbed by yearly contentions.

"Neither can stand these progressive and enormous increases in the cost of production of anthracite coal, followed necessarily by corresponding increases in its price.

"It is peculiarly fortunate, therefore, that existing conditions have all been the result of arbitration by third parties, so that neither party can say that it has not had due consideration. There can be no doubt that the good of all concerned will be served best by adhering to the results thus reached."

Mr. Roosevelt's Intervention.

BY R. W. RAYMOND.

Mr. Roosevelt (not, of course as President of the United States, but as a distinguished and estimable individual, temporarily holding that office) has again intervened in a labor dispute—this time concerning bituminous-coal miners. It is reported that his letter, urging a peaceful settlement of the threatened conflict, was solicited by the parties, as a needed pretext for a new conference in the interest of peace. He could not have rendered to the country a more important service—if only he were not the President! But, while I see in this occurrence an additional confirmation of my opinion, long ago expressed, that public executive officers (even as individuals) ought neither to undertake the labor and responsibility, nor set the dangerous precedent, of such interference in affairs beyond their sphere of duty, I cannot but share the general sympathy with Mr. Roosevelt's spirit, and the general hope that his action may avert a great national calamity.

Now it is reported that he intends also to take a hand in the new anthracite controversy. Well, I think this would be likewise a mistake, as strengthening a series of unfortunate and mischievous precedents; but if Mr. Roosevelt does not agree with me in regarding himself as debarred from using the *prestige* of his official position to lend influence to his individual action, I need not quarrel with his motives, or pray for the failure of his well-meant extra-official activities.

If Mr. Roosevelt really feels bound to take part again in the Pennsylvania anthracite business, the best thing he could do would be to call together again his own Anthracite Strike Commission, requesting it to report to him whether any change in the situation, since the date of its report, warrants a change in the conclusions which it then declared.

Any other form of intervention on his part would constitute a new precedent, not very creditable to him as an individual—namely, the disavowal of the judges he selected, the judgment he approved, and the whole proceeding for the expense of which, upon his recommendation, an appropriation of public money was voted by Congress.

Copper Production of the World.

Through the courtesy of L. Vogelstein & Co., American agents of Aron Hirsch & Son, of Halberstadt, Germany, we have received their estimates of the world's copper production in 1905, which are given as follows, in English tons:

	1903.	1904.	1905.
United States	311,536	366,522	397,909
Spain and Portugal	49,730	50,000	48 000
Mexico	45,315	52,500	60,000
Chile	31,100	33,000	33,000
Japan	31,360	32,000	28,000
Germany	21,205	24,500	25,500
Canada	19,320	21,500	24,000
Australia	29,000	30,000	35,000
Peru	7,800	7,000	8,000
Russia	10,320	10,700	11,000
Cape Colony	5,230	7,250	9,000
Norway and Sweden	5,915	6,000	6,000
Italy	3,100	3,250	3,300
Newfoundland	2,060	2,000	2,200
Bolivia	2,000	2,000	2,000
Austria-Hungary, Servia and Bosnia	1,306	1 500	1,300
Turkey	1,400	1,500	1,400
Others(Engl'd,Argentina)	1,090	1,300	1,000
Total	578,787	652,522	696,609

From the same source is obtained the following analysis of the United States' output, the figures being in pounds:

	1905.	1904.
Lake Superior	218,000,000	210,000,000
Arizona	231,000,000	191,000,000
Montana	325,000,000	312,000,000
New Mexico	5,000,000	7,000,000
California	21,000,000	27,000,000
Utah	59,000,000	47.000,000
Colorado	10,000.000	5,000,000
Alaska	5,000,000	2,000,000
Wyoming	2,500,000	4,000,000
Idaho and Nevada	1,000,000	2,000,000
Tennessee and Southern States	12,000,000	12,000,000
Other States	2,000,000	2,000,000
Total	891,500,000	821,000,000

Professional Papers.

Gas Producers for power. J. I. Wile. *Gas Engine.* Mch., 1906. Pp. 79-83.

Exhaust Steam, Utilizing. Alex. A. Maver. *Cassier's Mag.,* Mch., 1906. Pp. 407-414, illustrated.

Suction Gas Producer, the W. H. Booth. *Cassier's Mag.,* Mch., 1906. Pp. 415-426, illustrated.

Boiler-House Economy. Alfred W. Bennis. *Cassier's Mag.,* Mch., 1906. Pp. 373-378, illustrated.

Electricity in the Foundry. H. S. Knowlton, *Cassier's Mag.,* Mch., 1906. Pp. 389-397, illustrated.

Coal Trade, the British, Wages and profits in. T. Good. *Cassier's Mag.,* Mch., 1906. Pp. 370-372.

Mechanical Draft Production, The conditions of. Walter B. Snow. *Cassier's Mag.,* Mch., 1906. Pp. 398-406.

Plaster Mining and Preparation in the vicinity of Paris. Jacques Boyer. *Eng. Mag.,* Mch., 1906. Pp. 850-859, illustrated.

Siemens-Martin Steel, Notes on the Process of Manufacture. Achille Bosser. *Rev. Univ. de Mines, etc.,* Jan. 1906. Pp. 1-53.

Slate Mines, The New Method of Working, in the Anjou Basin. Angles-Dauriac. *Annales des Mines,* Nov. 1905. Pp. 519-567; illustrated.

New Works of the Traylor Manufacturing and Construction Company.

The new works of the Traylor Manufacturing and Construction Company, a plan of which is shown in the accompanying engravings, are located on the Little Lehigh river at Allentown, Penn., and alongside the tracks of the Lehigh Valley Railroad, about three-quarters of a mile from Allentown station, just outside the city limits. The company had works at Belleville, N. J., but these it has now abandoned.

The new works at Allentown consist of an office building, carpenter shop, pattern shop, pattern storage shop, power house, machine shop, foundry, flask house, storage warehouse and a boiler shop, where sheet steel and blacksmith work are done, together with large erecting floors and a lumber yard.

The machine shop and the foundry are each equipped with two traveling cranes running the full length and covering the full width of the main working floors. One crane in each shop is of 6-tons capacity, while the other is of 15-tons capacity. The machine shop has a tool room built within it, and in the foundry there is a blower room and a core room. Outside the foundry, but adjoining it, are two core ovens. The erecting floors adjoin the foundry and machine shops, and two loading tracks pass lengthwise through it. One of these is at the ground level, and the other is depressed.

Over the erecting yard and loading tracks runs an electric traveling crane, whose span is 76 ft.; the runway is 490 ft. long. The crane carries a main hoist of 30 tons capacity, and an auxiliary hoist, of five tons capacity.

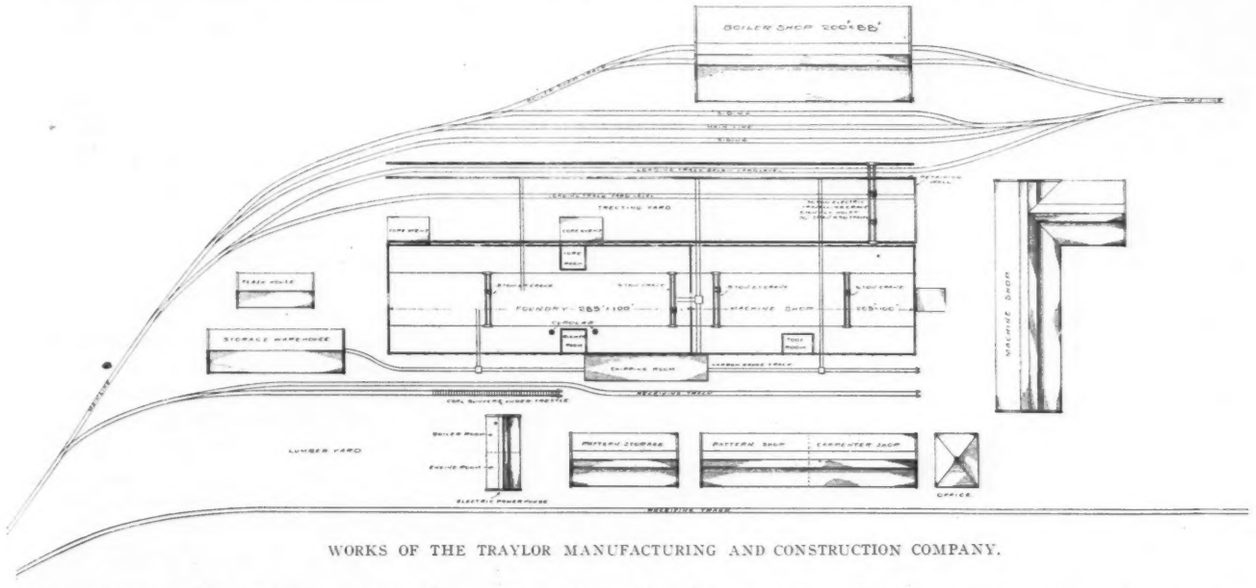
The foundry is equipped with two large cupolas, one of which is of such size as to make in single castings pieces weighing 50,000 lb. This building is equipped with electric traveling cranes, and is built along the most approved designs for the purpose of producing castings at the least possible cost. It is of such a size as to enable the company to handle an output of from 40 to 50 tons per day. In this department, 150 to 200 men will be employed.

The machine shop contains several machines weighing 75,000 to 100,000 lb. each, such as boring mills, openside planers and large lathes. All of these are accessible by the overhead traveling cranes. The turret-lathes and other smaller machine tools have lighter traveling cranes running above them. The sheet steel and blacksmith shops are equipped along like lines. being provided with a large number of jib cranes in addition to a large double-track crane spanning 50 ft. This will be used principally for assembling heavy blast furnaces. The blacksmith shops are equipped with hydraulic presses, steam hammers and trip hammers.

Adjacent to these shops is a pattern and carpenter shop, which is 75x200 ft. and is two stories high. This is equipped with modern wood-working tools. An elaborate, well arranged office adjoining the wood-working and pattern shops is also provided. The erecting floors are of such a size as to require an overhead traveling crane, having a lift of 30 ft., a span of 76 ft. and a horizontal travel of 390 ft. This crane enables heavy machinery to be loaded on outgoing cars, and unloads incoming cars.

The power plant consists of two 204-h.p. water-tube boilers, an air compressor, and two Corliss engines, direct-connected to two 100-kw. generators. The current is transmitted to the different parts of the works for operating the machines. The entire plant is operated electrically. The air compressor furnishes air for all of the chipping and riveting hammers. A general warehouse and store room 100x200 ft. is now in course of construction along the railroad siding. All of the buildings are of modern construction with brick walls and slate roofs, well lighted.

The company has 1800 ft. along the railroad tracks and a tract of land consisting in all of about 19 acres. The floor space in the new works is about 100,000 sq.ft. The main track line passes between the boiler shop and erecting yard, and nine side tracks run into the works. Of these, two run through the sheet-steel and blacksmith shop, two lie beside the main track, on either side, one for incoming and one for outgoing cars; the next in order are two loading tracks, which both lie under the 490 ft. runway of the big crane. One track is depressed below the yard level to bring the tops of the cars even with the ground; the other is at the yard level. Next between the foundry and the pattern shops are two sidings. One of these runs on the general level to bring new material into the foundry yards, and the other climbs a trestle to deliver coal or other fuel into bunkers beneath. The ninth siding (which is also used for receiving material) skirts the outside of the grounds. Besides these tracks there is a narrow-gage track within the works which connects the various departments.



WORKS OF THE TRAYLOR MANUFACTURING AND CONSTRUCTION COMPANY.

A 40-story tower is planned for the Singer building on lower Broadway in New York City. The present office building of the Singer Manufacturing Company is a 14-story structure on Broadway, near Liberty street. According to the plans, it and the adjacent 11-story Bourne building are to be combined into a 15-story structure. The tower will rise from the center of the new structure to a total hight of 594 ft., or 392 ft. above the main building roof, which will be 202 ft. high. This tower will be 65 ft. square, and the upper four stories will be in the form of a dome, crowned with a cupola and flagstaff.

Personal.

Mining and metallurgical engineers are invited to keep THE ENGINEERING AND MINING JOURNAL informed of their movements and appointments

Forbes Rickard is visiting Arizona.

R. A. Airheart, of Cripple Creek, Colo., is in Parral, Mexico.

Jesse Carlton Scobey, of Denver, Colo., has been a recent visitor in New York.

Charles Janin, of San Francisco, California, was a recent visitor in New York.

E. A. Wiltsee, of New York City, has made a hurried trip to Mexico City, Mex.

T. L. Oddie, a prominent Tonopah mine operator, is visiting the Eastern States.

W. H. Dohrmann, of San Francisco, is looking over the Bullfrog mining district.

E. G. Spilsbury, of New York, has returned from a professional visit in Europe.

M. M. Johnson, of the staff of Samuel Newhouse, is in Nevada on professional business.

Redick R. Moore, of the Oaxaca Smelting and Refining Company was in Mexico City last week.

W. P. Dunham has been at the Bingham Central mine at Bingham, Utah, on professional business.

A. I. Goodell, of Northport, Wash., is in New York for a few days. His address is Hotel Manhattan.

R. N. Dickman, of Chicago, has been in the iron districts of southern Utah on professional business.

H. H. Cookson, of Tonopah. is at present visiting San Francisco in connection with his mining interests.

Sir Henry M. Pellatt, of Toronto, has sailed on his return voyage from England and is expected home this week.

Frederic Hobart, of New York, attended the meetings of the Canadian Mining Institute held in Quebec last week.

Walter H. Willey has been making an examination of the Ohio Copper Company's property at Bingham, Utah.

Walter E. Trent, of San Francisco, has gone to Queensland, Australia, on business for his father, L. C. Trent.

A. H. Lubeck, superintendent of the Parral Milling Company, Parral, Mexico, is visiting his home in Salt Lake City.

Prof. A. A. Michelson, of the University of Chicago, has been elected an honorary Fellow of the Physical Society of London.

Sir Alexander Kennedy, the eminent English engineer, has been elected an honorary member of the Athenæum Club, London.

Jean Felix Brandes left Denver last week for a professional trip to Chihuahua, Mexico, and expects to return via San Francisco.

Chas. J. Bandman, of San Francisco, is at Prescott, Arizona, superintending the installation of extensive mining machinery.

Thomas F. Cole, of Duluth, arrived in Salt Lake on the 4th inst., and while in Utah inspected the Silver King mine at Park City.

August Mathez has completed the examination of the Grand Gulch copper mine in northern Arizona for Samuel Newhouse.

G. A. Baird, president of the Western Exploration Company, attended a meeting of shareholders of that corporation at Salt Lake last week.

Dr. Julius Buss, engineer for the Luhrig Co., of London, is visiting the United States, having arrived at New York this week.

S. A. Worcester, mechanical engineer at the Golden Cycle mine, Victor, Colorado, is visiting Leadvile, Colo., on professional business.

John W. Conner, of the Veta Colorado Mining and Smelter Company, Parral, Mexico, has left for a short vacation in the United States.

Robert Jaffray, of Toronto, who is extensively interested in Western mining industries, has been appointed a member of the Canadian Senate.

J. B. Tyrrell, formerly of Dawson City, Yukon Territory, Canada, was in Quebec last week attending the meeting of the Canadian Mining Institute.

L. G. Parks, of the Cia. Minera, San Francisco de Taricho Oaxaca, leaves for Chicago next week on a business trip in the interests of his company.

Horace V. Winchell, geologist for the Amalgamated Copper Company, has returned to Butte, Mont., from a business trip to Nevada and California.

G. W. Wilson has succeeded George Gunn as field representative of the American Smelting and Refining Company, with headquarters in Salt Lake City.

John Hays Hammond has been making an inspection of mines in Bingham, in which the Guggenheim Exploration Company is interested, during the past week.

J. Nelson Nevius, of Hermosillo, Sonora, Mexico, is in New York on professional business. His temporary address is 71 Comstock Place, South Orange, N. J.

Dr. Chas. S. Palmer read a paper before the American Chemical Society in New York on March 9, on the Specific Atomic Volumes of the Periodic System.

J. C. McCormick, lately president and manager of the Dominion Wire Manufacturing Company, Montreal, has resigned and is succeeded by F. W. Fairman.

Hermann A. Keller, of New York, has returned from a professional visit to North Carolina and this week will leave for Cuba, to inspect mining property there.

M. L. Fuller, of the United States Geological Survey, will give a course of lectures at the University of Chicago in April on the hydrologic work of the Government.

Charles V. Drew, connected with the New York office of Frank Klepetko, was at Houghton, Mich., last week, visiting the Michigan College of Mines, of which he is a graduate.

M. F. Edmands, superintendent of Greenough Brothers Reduction Company's works, has returned to Mullan, Idaho, from New York, where he went on professional business.

Captain James Wilcox, superintendent of the Mass Consolidated Mining Company at Mass City, Mich., was in Boston this week to attend a meeting of the directors of the company.

A. W. B. Hodges, general manager of the Granby mines and smelter in British Columbia, has been making an inspection of Utah smelters and concentrating mills for the purpose of study.

Dr. J. W. Beede, of Indiana University, has been engaged to take charge of the detailed mapping of the Permian formations of Kansas for the University Geological Survey of Kansas.

J. Parke Channing, of New York, who recently examined some mining ground in Butte for Adolph Lewisohn, is now inspecting property in Utah. He expects to return to Butte shortly.

Fred Reuther, mining engineer with the Oliver Iron Mining Company at Virginia, Minn., recently examined a copper property in Beaverhead county, Mont., for Calumet, Mich., persons.

Capt. D. H. Jarvis, of Sitka, Alaska, is spoken of as a candidate for the Governorship of Alaska in succession to Governor Brady, who has tendered his resignation to President Roosevelt.

Patrick Clark, of Spokane, president of the Furnace Creek Copper Company in Nevada, and organizer of the Bullwhacker Company, in Montana, spent a few days in Butte last week.

Norman W. Haire, of Houghton, Mich., general manager and vice-president of the Tamarack, Osceola, Isle Royale and Ahmeek copper mines, was in Boston last week on business.

H. Mortimer Lamb, secretary of the Canadian Mining Institute, who has been in the hospital in Montreal for several weeks suffering from a severe attack of typhoid, is reported to be convalescing.

Chas. M. Schwab's proposed visit to Mexican mining centers, has been abandoned on account of illness. After returning to Los Angeles, Cal., from Tonopah, Mr. Schwab became seriously indisposed.

Fred W. Bacorn, president of the Cable Consolidated Company, of Montana, and

one of the head men of the Butte & Bacorn Company, of Butte, has returned to Butte from a business trip to the east.

George Alexander, manager of the Kootenay Ore Company, Ltd., of Kaslo, B. C., and of several mines in the Slocan district, has been a recent visitor in New York. He sailed for London on March 10.

J. C. Brennan, vice-president and manager of the Ajuchitlan Mining and Milling Company, South America, will shortly join Alvin B. Carpenter in Mexico City, and the firm name will be Carpenter & Brennan.

James Jopling, mining engineer with the Cleveland-Cliffs Iron Company at Ishpeming, Mich., has returned from a five months trip in Europe, where he studied the methods of underground operations in the largest mines.

Richard C. Shaw has returned to New York from Paris, where he went Feb. 1, on business in connection with the Montezuma mine in Costa Rica. At this mine a plant with a capacity of 300 tons per day is now being installed.

Captain James Chynoweth, superintendent of the Centennial, Allouez and other Fay mines in the Lake Superior copper district, has returned to Calumet, Mich., from an extended trip through the southwestern mining regions.

Dr. Eugene Haanel, superintendent of mines, Department of the Interior, Ottawa, Canada, has returned to Ottawa from Sault Ste. Marie, Ontario, where he has been conducting experiments upon the electric smelting of iron ore.

J. Obalski, for a number of years past inspector of mines for the Province of Quebec, has been appointed superintendent of mines and chief of the Mining Bureau, with enlarged power. Mr. Obalski has done excellent work in his position.

John D. Gilchrist, superintendent of mines for the Colorado Fuel and Iron Company, is in Duluth looking for a superintendent for his Sunrise, Wyo., property, in place of J. H. Crane, who lately died. He is also looking for some other men from the Lake Superior region.

E. R. Elliott, superintendent of the Maas, Negaunee and Jackson iron mines of the Cleveland-Cliffs Iron Company on the Marquette range, has resigned to take the general management of the Cuban mines of the Juragua Iron Company, a subsidiary concern of the Bethlehem Steel Company. The mines are located near Santiago, Cuba.

Obituary.

Harvey Beckwith, mining engineer, died on March 3 at North Park avenue, Philadelphia, from injuries received by a fall. Mr. Beckwith was born in Northfield, Mass., 77 years ago. He was one of the early settlers of Virginia City, Nev., and for many years took an active interest in the affairs of that city. Mr. Beckwith is survived by a widow.

Henry Mason Quig, formerly chief engineer of the Shoenberger Steel Company, now a part of the United States Steel Corporation died last week at Pittsburg. He was 71 years old and was identified with the Shoenberger works about 30 years. He was born in Philadelphia and served several years in the navy when a young man. After leaving the navy, Mr. Quig removed to Pittsburg and remained with the Shoenberger company until the plant was sold to the American Steel and Wire Company. For several years he has been retired. Mr. Quig is survived by a widow, two sons and two daughters.

Societies and Technical Schools.

Engineers' Society of Western Pennsylvania—This society has decided to take new headquarters in the Fulton building, Sixth street and Duquesne way, and give up the old headquarters at 410 Penn avenue, Pittsburg, and will move April 1. At a meeting of the structural section of the society, Feb. 27, the subject under discussion was "Erection Methods as Applied to Structural Steel Work," led by Willis Whited. There was a good attendance and the discussion was very thorough, taking in all branches of the work from shop to field construction, together with technical details of each department.

University of Wisconsin—Mr. B. A. Behrend, Chief Electrical Engineer, Allis-Chalmers Company, Milwaukee and Cincinnati, recently delivered an address before the College of Mechanics and Engineering at the University of Wisconsin, Madison, Wis., entitled "High Speed in Modern Engineering." In this lecture Mr. Behrend laid stress upon the remarkable change that has been wrought during the past ten years in the field of prime movers, and the fact that the reciprocating steam engine, which held its own for over 100 years, has gradually yielded, in a number of important fields of operation, to the rotating steam turbine—a change so radical that it may be said to have inaugurated a new epoch in engineering. Mr. Behrend discussed the conditions to be fiulfilled for grappling with the difficult task of designing machinery for such high periphral speeds as 3 and 4 miles per minute, and he showed how rotating bodies had to be shaped in order to uniformly distribute the stresses and minimize them, as to meet these conditions. The lecture was illustrated with slides representing the stresses in rotating disks, and the details of steam turbo-generators.

Mr. Behrend made the statement that the size of the generating unit in large power plants is going to increase considerably, and that during the next few years units of from 10,000 kw., wound for potentials of from 10,000 to 30,000 volts, are likely to be installed, as the steam turbine and generator lend themselves particularly well to units of very large capacity, and units of such capacity can be more readily wound for high potentials.

Trade Catalogs.

The following trade catalogs and circulars have been received:

The W. S. Tyler Company, St. Clair, Wason & Aaron Sts., Cleveland, Ohio. Price list of Catalog No. 24; paper, 7 by 4 in.

S. Morgan Smith Company, York, Pa. Catalog; Sixth Edition, "McCormick" Turbine; Pp. 124, illustrated; paper, 5-¼ by 7-¾ in.

John A. Roebling's Sons Company, Trenton, N. J. Pamphlet, Wire Rope Splicing; Pp. 56, illustrated; paper, 9 by 7 in. 1906.

The Brown Hoisting Machinery Company, Incorporated, Cleveland, Ohio. Catalog, "Brownhoist" Cranes; Pp. 261, illustrated; cloth, 6 by 9 in. 1903.

Hendryx Electro Cyanide Company, 1738 Broadway, Denver, Colo. Pamphlet, Descriptive of the Hendryx Process; Pp. 16, illustrated; paper, 8 by 5 in.

The Pittsburg Instrument and Machine Company, 625-27 Fountain St., near Seventh Ave., Pittsburg, Pa. Illustrated Catalog & Price List, Engineers' and Surveyors' Instruments and Accessories; Pp. 45, illustrated; indexed; paper, 6 by 9 in.

Industrials.

The Pelton Water Wheel Company has let a contract for new works in the Mission District of San Francisco and expects to be established there by July 1 of this year.

The Bullock Electric Manufacturing Company, of Cincinnati, Ohio, has placed an order with the Electric Cable Company, New York, for the new insulating compound, Voltax, for impregnating field and armature coils. This material is considerably cheaper than rubber insulation and gives satisfactory service.

In rebuilding the factories of the Ohio Brass Company, Mansfield, Ohio, which were partially destroyed by fire last year, the order for roofing was placed with the H. W. Johns-Manville Company through their Cleveland branch. The roofing to be used is the "J-M Asbestos Roofing." The contract calls for 850 squares.

The Power and Mining Machinery Company of Cudahy, Wisconsin (suburb of Milwaukee), has recently closed a contract for a complete rock-crushing plant to be erected for the Little Falls Stone Company, Little Falls, N. Y. This plant will embody the latest ideas in crushing prac-

tice and will be built throughout in accordance with designs made by the Power and Mining Machinery Company.

The Colorado Iron Works Company, of Denver, Colorado, recently sold and shipped impact screens to the following customers: Hall M. & M. Co., Nelson, B. C.; Sunnyside Mill, Eureka, Colo.; Eleventh Hour Gold M. Co., Spearfish, S. D.; Blake M. & M. Co., Denver, Colo.; Wheeling Milling Co., Mine La Motte, Mo. A smelting furnace was likewise shipped to Berlin, Germany.

Seven pairs of large blowing engines will be installed at the Edgar Thompson furnaces, Braddock, Pa., and one pair at the Isabella furnaces. Sharpsburg, Pa., both within the Pittsburg district. Eight of the engines will have steam cylinders 44 in. in diameter by 60-in. stroke, and air cylinders 84x60 in. The remaining units will be equipped with steam cylinders 84-x60 in. and air cylinders 84x60 inches.

The remarkable strides recently made in the design and construction of large gas-engine units in this country and abroad, have indicated that the possibilities for the application of that form of prime mover are almost limitless. German builders were among the first to appreciate this fact. American builders, however, have not been slow to see the advantages offered by large units. The Allis-Chalmers Company, of Milwaukee, has for some months past sold a number of gas engines of the Nürnberg type, in capacities ranging from 300 to 5000 h.p. for power purposes. A 1800-b.h.p. unit was recently ordered for the Crystal City, Mo., plant of the Pittsburg Plate Glass Company. It is of the well-known four-cycle double-acting type, direct-coupled to a 1000-kw. generator. The Illinois Steel Company, Chicago, at present using a large number of steam units of various kinds, has very recently ordered two large gas-engine generating units, twin tandem type, 1000 kw. each. These machines will be installed in the company's present power plant for lighting and power purposes.

Construction News.

Bingham, Utah—The New England Gold and Copper Company, Henry M. Adkinson, Bingham, manager, is in the market for an air compressor plant.

Elizabethtown, New Mexico—The Gold and Copper Deep Tunnel Company, Elizabethtown, Colfax county, New Mexico, contemplates installing electric drills.

Garfield, Utah—General Manager D. C. Jackling, of the Utah Copper Company, has announced that contracts for the Garfield plant will be let within the next 30 days. Mr. Jackling's office is in Salt Lake City.

Cataract, Montana—The Cataract Copper Company, operating in the Cataract district of Jefferson county, Montana, has decided to enlarge its concentrator by the addition of 8 Wilfley and other concentrating tables. Marcus L. Hewit, of Basin, Jefferson county, is manager for the company.

Calumet, Michigan — The Calumet & Hecla Mining Company, James MacNaughton, general manager, will next spring remodel the last section of 5 heads in its stamp mills at Lake Linden. These heads will be reconstructed to treat rock from the amygdaloid branches of the mine and the concentrating machinery will be similarly designed.

Montezuma, Colorado—The Lenawee Tunnel and Reduction Company, Col. J. H. Myers, Montezuma, Colo., manager, will build an electric plant to convey power to the property of the Pennsylvania Mines Company, a distance of four miles. The Lenawee Company will this summer erect a 20-stamp mill, with daily capacity of forty tons.

Cumberland, Nova Scotia — The Maritime Coal and Railway Comptny, of Cumberland, Nova Scotia, contemplates establishing an electric power plant at the mouth of its coal mines, from which power will be transmitted to Amherst and other towns in Nova Scotia. The Hon. William Mitchell, of Montreal, Canada, is president of the company.

Painesdale, Michigan—Contracts for the machinery for a two-head addition to the Baltic Mining Company's mill at Redridge will be let shortly. The Baltic's milling capacity is now 2600 tons of rock daily, and when the addition to the plant is completed the facilities will permit the treatment of 4000 tons of rock daily. F. W. Denton, post-office address Trimountain, Mich., is superintendent.

Salt Lake City, Utah—James J. Chambers, president of the Inter-Mountain Power Company, is about to let contracts for 6000-kw. electrical machinery for power plants to be installed during the year in Little Cottonwood cañon, near Salt Lake City.

The Utah Development Company, W. C. Orem, Salt Lake City, manager, contemplates the erection of a concentrating mill in the near future.

Port Henry, New York—A power-plant is to be built on the shores of Lake Champlain at this place for Witherbee, Sherman & Co. An 800-kw. turbo-generator, surface condensers, and water-tube boilers will be installed; and a 6-mile, 6600-volt transmission line will be erected between the station and the mines at Mineville. The power-house will be of monolithic (concrete) construction, and a reinforced-concrete chimney will be erected. Henry C. Pelton, 1133 Broadway, New York, is architect.

Houghton County, Michigan — A contract has been awarded the Wisconsin Bridge and Iron Company, of Milwaukee, Wis., by the Wolverine Mining Company, P. O. address Kearsarge, Mich., for the construction of a steel shaft and rock house at its No. 3 shaft, to replace the structure destroyed by fire a few days ago. The steel structure will be built substantially along the lines of that of No. 4 shaft of the Mohawk mine, which has proved very satisfactory. It is expected that the new building will be ready for use in three months.

Special Correspondence.

San Francisco. March 7

The city attorney of Oroville has asked for a postponement of the suit of the Nevada Gold Dredging Company against that town, and it is now thought that the matter will be disposed of amicably before the time set for trial—March 31. As the injunction allows the company to continue its operations while the case is pending there was no objection to the continuation on the part of the company. The facts are, it is claimed, that the city of Oroville seems to have gotten itself into rather a bad position through this suit. A glance at the map will show that when the limits of the corporation were laid out the line was made to run around the property of the Earl Fruit Company and El Oro Mining Company, the ground of which is owned by some of those interested in the Fruit Company. Why that was done does not appear on the surface, but evidently it was with some purpose, because the town limits would naturally include the property mentioned, it is claimed. In the complaint of the Nevada Company it is set forth that the property belonged to one James G. Gray, and was by him granted to one Leggett, who, in turn, granted it to the Central Mining Company and then to the Nevada Gold Dredging Company. The company has spent $100,000 on its property there, it is stated, and spends $2000 in the town every month for labor. After the town was incorporated the employees of the company were repeatedly arrested, it is affirmed, and as the company is a Nevada company it applied to the United States Courts for a restraining order. The complaint alleges these facts and also certain others to show that the town of Oroville is not properly and legally incorporated, which, if proven, will necessitate the entire process of incorporating to be done over again.

The famous Polar Star hydraulic mine near Auburn, Placer county, will be started up again as soon as a legal permit can be obtained, and under new management, with J. B. Rick as superintendent. The Polar Star is one of the old hydraulic mines of that section, being one of the first of the blue-lead mines to be opened up. It has been running at irregular intervals for upward of thrity years, and has always been reputed to be a good paying property. The Polar Star, in conjunction with the Liberty Hill Mining Company, has an excellent debris-

restraining dam in Bear river. It is one of the most successful dams in northern Placer, and it is due largely to this that these two mines have been able to operate while many other mines, once paying properties, are now nothing more than a waste of boulders. The mine was closed in the early part of last spring, owing to deficiency in the finances of the company then operating it.

The municipality of San Francisco is about to inaugurate proceedings by which mining stocks of mines incorporated in other States than California, may be duly taxed. It is alleged by the representative of the administration that many millions of dollars worth of mining stocks and securities of corporations formed in other States are held here, and that the States in which they are issued are restrained from collecting taxes on them on the plea that they are "foreign" owned, while the assessor in San Francisco is opposed in his attempt to assess them on the plea that they are taxed at the office of issue.

The Mexican consul has received notification from the Mexican Secretary of the State that President Diaz has revoked the recent order forbidding foreigners to locate mines in the State of Sonora, Mexico, and in Lower California. Some hundreds of properties in Sonora and Lower California are already owned by residents of San Francisco, and a number are "denounced" every year.

Recent acquisitions give the Union Oil Company of this State a fleet of nine tank steamships and sailing vessels, which possess an aggregate carrying capacity of 11,500,000 gallons. At least five of these will be employed in carrying oil direct from the Santa Barbara, Ventura, Los Angeles and Orange county fields to Panama, whence their cargoes will be pumped across the isthmus through a pipe-line paralleling the railroad into the holds of tank steamers on the Atlantic, California oil can then be marketed in England, France and Spain, as well as in the Orient.

The Nevada County Promotion Committee has offered a prize for the best design for a mineral monument to be erected at Colfax, where the narrow-gage road connects with the main overland railroad line. The committee will build such a pile, using all the minerals produced in the country in its composition, as an advertising proposition.

The decision of the United States Circuit Court of Appeals Monday, February 26, dissolving the injunction against the smelting operations of the Mountain Copper Company, at Keswick, and holding, in effect, that damage from the sulphur fumes accruing to the forestry holdings of the plaintiff (the United States Government) was susceptible of appraisement and liquidation as in the case of private parties suffering similar injury, is already having a perceptible and favorable effect upon the copper-mining industry of Shasta county.

Frank Ensenberger has taken charge of the Union Hill mine near Grass Valley, on behalf of the San Francisco and Los Angeles men who recently purchased it. The sale includes the Cambridge and Lucky claims, which adjoin, but neither of which have been much prospected. The Union Hill, however, has been a producer but has not of late been worked on a large scale. The purchasers took over the lease from the leasers who were working, paying them $3 per day for the time they had put in.

The National Mining Company is having a new cyanide plant installed on the property in Rich Gulch, Shasta county, for the reduction of the tailings from the 10-stamp mill and the sulphides saved by the concentrators. The plant is being built at the lower end of the mill and forms part of it. The tailings will run direct from the concentrators into the large vats and there treated by the cyanide process. Chas. Dozier, until recently associated with Prof. S. B. Christy at the University of California, has charge of the new plant.

The Zenda mill in Amalie district, Kern county, to which 10 stamps have just been added, has been started up on ore from the mine, there being enough rock on the dump to keep the mill busy for three months. A singular development in this mine is the uncovering of a large body of free-milling ore which will yield easily $10 to the ton. The ore near the surface has all been base. In the same vicinity the Gold Peak Mining Company's 10-stamp mill is nearing completion. The company's cyanide plant is of sufficient capacity to serve a 30-stamp mill, it being the intention to bring the whole plant to that basis. There are now some 6000 tons of ore on the Gold Peak dump. Ore is brought from mine to mill by a tramway 1¼ miles long. Work has been resumed at the Cowboy mine. A new tunnel is now being driven about 250 ft. below the old workings.

Tonopah. Mar. 12.

The chief subject of conversation in Tonopah just now is the bright outlook of the new Manhattan camp, which is situated north of this town. The chief gold claims at Manhattan continue to open up well, and the general opinion is that the field will develop into a permanent mining center.

There is also considerable activity just now at Willow Springs, the new camp about nine miles on the Tonopah side of Manhattan. Bert Hickman, who located a large number of claims in the Willow Springs district last summer, is developing a group of eight claims, with satisfactory results. Several well defined ledges crop on the surface, and numerous assays running from $7 to $300 in free gold have been secured from the croppings. The deepest shaft is down about 30 feet, at which point the ledge is 12 feet wide and carries good milling values. Mr. Hickman and Clinton L. White, of Sacramento, who is associated with him, this week bonded this group to Tonopah people, who will form a company to develop the property.

The miners and prospectors working in the vicinity of Millett's, about 25 miles north of Manhattan, met last Saturday and organized the Millett Mining District, with Fred J. Jones as recorder. The district embraces the territory on the west side of Smoky Valley, in Nye county. The south line runs west from Hot Springs to the summit of the Toiyabe Range, and thence northerly along the summit of the range to the county line between Nye and Lander counties, while the easterly line follows the stage road.

Superintendent Bryce Turner last week gave out a report in regard to progress and conditions in the Belmont. The orebodies are showing up better than ever, and the Belmont now ranks with the great mines of the camp. Development work is progressing on all levels from the 600 to the 900, inclusive. On the 800 level the drift has been widened and now exposes a ledge 15 feet in width, every foot of which is of shipping grade. The work of enlarging the shaft by the addition of a third compartment is being pushed from four levels, and as soon as this is completed the output of the mine will be largely increased. The foundations for the 100-h.p. electric hoist are completed and the hoist will be in operation by the middle of next week. The new 60-foot gallows frame is now being framed.

The Jim Butler Mining Company is now hoisting shipping ore from the Wandering Boy ledge. At the Stone Cabin shaft the foundation for the engine is being prepared and the formation is becoming more highly mineralized with every shot. Stringers of quartz have been met with.

The Midway Mining Company, at a meeting of the board of directors held at the office of the company recently, declared a dividend of 5 cents a share on on the capital stock of the company, payable April 2. This is the second regular quarterly dividend declared by the Midway, and it seems probable that the quarterly distributions will continue without interruption.

Goldfield. March 10.

From a metallurgical standpoint things are looking well in Goldfield. Nearly all the mills are working to their full capacity. The American mill, now under lease to the Red Top Company, has been working steadily with three shifts since the 20th on Red Top ore. The Nevada Goldfield Reduction Company (Frank mill) is now running on a consignment of Red

Top ore. The Kinkead mill, on the brow of Columbia mountain, is running on Kendall ore, and parties interested declare the plant a complete success.

Work on the tube mill which is being installed at the Combination plant is still in progress, and in a short time the sliming plant will be in operation.

The stoping of shipping ore is in progress in the Kendall mine on the 60-ft. level and the levels above. A shipment of five carloads of ore has recently been made. An agreement is about to be consummated whereby a 50-h.p. hoist will be erected on the Kendall within 30 days. After the erection of this hoist work on the lower levels will be pushed more vigorously.

Twenty-six sacks of high-grade ore were recently shipped from the Sandstorm to the Selby smelter by express, and 36 sacks more are about to be shipped in the same way. These two shipments are said by an authority to be the richest ore that has ever left the camp. Ore is being sacked from three shafts on the Sandstorm, most of it coming from between the 100- and 150-ft. levels. The ore-shoot from which this is coming is opened up for a distance of 300 feet.

George Wingfield is soon to commence sinking a deep shaft on the east side of Columbia mountain for prospecting purposes. It is his intention to explore the mountain to a greater depth than has heretofore been attained. For present requirements the 10-h.p. gasolene hoist which has been in use on the Kendall will be installed on the ground.

On the Booth property, which adjoins the Red Top on the north, a 25-h.p. hoist has been installed. The shaft is now down 75 ft., and it is the intention of the company to continue sinking to a depth of 250 ft. before cross-cutting is commenced.

The Laguna, which adjoins the Red Top on the east, is still sinking with its 15-h.p. hoist. The shaft is now down 70 ft. and will be continued to a depth of 200 ft. or more, if necessary, before cross-cutting will be commenced. The depth of the shaft will depend on the depth of wash which it is necessary to penetrate before getting into solid formation.

The Mohawk is blocked out into several leases, which will not expire until January, 1907. Several loads of low-grade ore have been picked up by leasers, but as yet no shipping ore in quantity has been encountered.

The Gold Bar mine in the Bullfrog district, which now has a hoist and headframe under erection, has encountered a narrow streak of ore, said to be of remarkable richness. This and ore of a lower grade are being sacked for shipment.

Considerable surface trenching has been done on that portion of the Golden Eagle claim under lease to Day and associates. As soon as the most advantageous location has been determined by trenching, sinking will be commenced.

F. N. Fletcher and associates have taken a lease on the Old Bullion mine in Montezuma and a force of miners is now at work completing the tunnel started by the Montezuma company. The Old Bullion is said to have been a profitable producer in the past. The tunnel now in progress will open the old workings to a depth of 130 ft. It is claimed that high-grade silver-lead ore is now in sight.

On the Spokane claim in Diamondfield a sump is being sunk at a depth of 90 ft. As soon as the work is finished a crosscut will be run out to the west for the purpose of cutting a ledge which was exposed in the shaft at a depth of 40 feet.

Butte. March 10.

Amalgamated is mining all the ore its Washoe plant will handle and will soon place its previously enjoined mines in shape for production. It does not need the ore of these properties at present, but will hold the reserves for emergency. The Washoe plant is receiving more than 8000 tons a day and the Great Falls about 3500. Its output of copper this month will be large, possibly 23,000,000 lb. The Clark mines are still giving the company 500 tons a day. Copper from this ore will not figure in the total output of the company. Work in the crosscut from the 2400-ft. station of the Anaconda is progressing rapidly. The main vein will not be cut for two or three weeks. A small vein has been cut.

North Butte is making arrangements to receive its new hoisting engine, which was shipped from Milwaukee a week ago. The company is maintaining an output of 1000 tons a day, and figures on an increase of 200 tons when the new engine is working. United Copper mines are producing their customary quantity of ore, about 1500 tons a day, 1200 of which is going to the concentrator in Basin and the remainder direct to the smelter. No change has yet been made in the system of working the property, but the new owners expect to make one or two shortly. La France Copper, operating the Lexington group, the only property of note that stands in the name of F. A. Heinze in Butte, is extracting between 200 and 300 tons of ore a day from the upper levels. Of this, Montana Zinc is taking 100 and the remainder is going to Basin in the name of Louis Girard, of Paris. A report here is to the effect that Mr. Heinze will lift the bond and turn the property over to the Cole-Ryan interests for stock and cash. No attempt has been made to unwater the lower levels.

Reins Copper has reached a depth of 1125 ft. and has 75 more to sink. The mine is giving up 450 gal. of water a minute. Raven has encountered one of its three veins on the 1500-ft. level and expects to cut the main one this week. The vein cut contains good copper ore. At the 1200 it was not good. Butte & Bacorn is sinking three shafts on promising copper leads northwest of the city. This company is composed of Pittsburg and Butte men and is ably financed. Butte Copper Exploration and General Development is unwatering old workings on its property. Both are making good headway and expect to touch bottom within the next two weeks. A slight accident at the former last week delayed work. Patrick Clark will enter the Butte field with his Bullwhacker Copper next week. He has good ground east of the Pittsburg mines. The latter company is making more than 300,000 lb. of copper a month and mining 200 tons of ore a day. It made five shipments of copper last month. The veins are looking good and improving as drifting continues toward the west. Butte & London is still sinking in wash. Its shaft is 80 ft. deep. Several buildings have been erected on the ground for the use of the company. Property of the Cable Lease Company has been taken over by the Cable Consolidated on a basis of 1,000,000 shares of new stock and $150,000 cash.

Salt Lake City. March 9.

The construction of the first of the steel buildings that are to make up the new concentrating plant of the Utah Copper Company, will commence during the coming week. Material for the warehouse is on the ground and that for the power plant is arriving daily. The work is to be under the supervision of General Superintendent Robert G. Gemmell.

The Garfield Improvement Company will start excavations in a few days for the ninety buildings which have been contracted to go up in the new smelter town of Garfield. Thomas F. Boal is to direct the erection of the buildings.

An important strike of Peacock copper ore has been made in the Utah Apex mine at Bingham on what is known as the Parnell level. The find is said by the management to be the most important one in the history of the mine. The vein is a large one.

A deed has been filed in Utah county in which E. W. Clark, receiver of the Overland Gold Mining Company, conveys to Denman Blanchard, of Boston, the mining and other property of the said company for a consideration of $37,500. The property is located in the Camp Floyd mining district. A mortgage as security for a loan of $15,000 in favor of Flora L. Clement, of Washington, D. C., has also been filed.

For a consideration of $314,000, Willard F. Snyder, president of the Honerine Mining Company, has disposed of 62,000 shares, the holdings of himself and associates in that corporation, to Peter Haack, of Los Angeles. The Horerine is located at Stockton, Utah.

The Ohio Copper mine at Bingham is under examination by W. H. Willey and corps of engineers in behalf of Samuel Newhouse and the Venture Corporation of London.

The electric power plant and mill equipment of the Sevier Consolidated Mining Company in the Gold Mountain district, Utah, is in commission and reports indicate that the plants are working satisfactorily. The mill is equipped to handle 100 tons of ore daily.

The Rio Grande Western Railroad Company will commence grading in a few weeks for a second line into the camp of Bingham, made necessary by the rapid development of the mines. The road will be built from Bingham Junction and will enter the copper camp along the right-hand side of the main Bingham cañon.

Utah mines paid dividends during February to the amount of $148,500, the distributions being: the Silver King, $100,000; Beck Tunnel Con., $15,000; Grand Central, $12,500; Victoria, $10,000; Sacramento, $5000; Uncle Sam Consolidated, $5000; Utah, of Fish Springs, $1000.

The St. Patrick Mining Company, with a capital stock of $50,000, divided into shares of 20 cents each, has filed articles of incorporation to operate property in Big Cottonwood mining district. D. A. Buck, of Salt Lake, is president.

Mining engineers, representing Thomas F. Cole, the Duluth mining operator, are in the State making examinations of several of Utah's principal producing mines. The investigations have been carried into Bingham, Park City, Tintic, Alta and Stockton. Mr. Cole is represented here by Walter Fitch, former manager of the United States Mining Company.

The stockholders of the East Ontario Mining Company, of Park City, have chosen the following officers for the ensuing year: E. M. Curtis, St. Louis, president; S. V. Derrah, Salt Lake, vice-president; P. R. Kingdon, Salt Lake, secretary. Vigorous development is to be done this year.

The Boston Consolidated Mining Company has let contracts to build two miles of standard railroad track to facilitate the handling of the copper-bearing porphyry ores to be mined by the use of steam shovels.

The annual meeting of stockholders of the West Quincy Mining Company, operating at Park City, is scheduled for the 15th inst., at Salt Lake City.

A verdict in favor of Frank Harryman, administrator, and against the Victor Consolidated Mining Company, has been rendered by Judge Ritchie at Salt Lake, the amount of the judgment being $38,250. The plaintiff alleged improper converting of stock of the Boss Tweed Mining Company, the latter having been merged into the Victor Consolidated. The company is operating in Tintic.

Robert C. Gemmell, general superintendent of the Utah Copper Company, has completed an examination of the Dalton & Lark mines at Bingham, having been employed to follow the engineers belonging to the staff of F. Augustus Heinze. The examinations have been made supposedly in the interest of Thos. F. Cole.

At a special meeting of stockholders of the Western Exploration Company at Salt Lake a change in the articles of incorporation of the company was authorized, allowing the holding of meetings of directors in Chicago.

The property of the Ohio Copper Company at Bingham is being subjected to examination by engineers in the employ of the Venture Company of London.

The stockholders of the Copper Glance mine at Bingham have ratified the action of the board of directors in negotiating a sale of the property to parties represented by John W. Burton, of Salt Lake, on the basis of 25c. a share, or $150,000 for the mine. The option calls for an initial payment on the purchase on the 25th inst., the balance to come in two, three and six months.

The steam shovel recently placed in commission at the Cactus mine in Beaver county is now working day and night stripping the surface, the orebody being covered to a depth of from 20 to 30 ft. Manager Hanchett, of the Newhouse Mines and Smelters, says it will be three weeks before the machine is working on ore.

The Bingham Central Mining Company's property at Bingham is now under examination, the same being directed by W. P. Durham, in behalf of the prospective purchasers of the company's bonds, recently authorized by the directors. F. J. Knoblock, a New York attorney, has been here examining into titles. The Bingham Central Company recently added to its domains the Red Elephant claim, which is considered to be a valuable asset.

The Pittsburg Consolidated Mining Company, operating at the head of American Fork cañon, Utah, has secured an option on the property of the Pioneer Mining Company, which owns a tunnel 400 ft. long on the Alta side. This tunnel will be extended on through the mountain to tap the Pittsburg orebodies. The Pittsburg company is about to make a sale of bonds to carry on its campaign of development.

The smelter of the Utah & Eastern Copper Company at Shem City, Utah, has been placed in regular commission again.

Denver. March 9.

Naturally the proceedings at Boise City, Idaho, are being watched with interest in this city, where the leaders of the Western Federation of Miners, at present imprisoned there, have their homes. The Grand Jury of the District Court at Caldwell returned indictments against all the men held on the charge of assassinating Governor Steunenberg, except perhaps Steve Adams, but as well against J. L. Simpkins, who is still at large. Charles H. Moyer, W. D. Haywood and George F. Pettibone are to be taken to Caldwell today to be arraigned. Three more confessions are said to have been made by members of the "inner circle," the identity of the makers being kept secret. A number of arrests will be made in Colorado, and it is understood that sheriffs in this State have received cipher telegrams and will locate certain parties at once.

The executive board of the American Smelting and Refining Company held a meeting at their offices in this city this week, and will probably authorize large improvements at the different plants in Colorado, which are located in Denver, Pueblo, Leadville and Durango. Daniel Guggenheim, the president, is here at present and will probably extend his trip of inspection through the West, where at Salt Lake City and San Francisco very large plants are in course of construction. S. R. Guggenheim and S. W. Eccles, members of the executive board, are here also. On their Western trip they expect to meet John Hays Hammond and other engineers at Salt Lake City to get their reports on matters connected with the affairs of the Guggenheim Exploration Company and other allied interests.

During the month of February the mint in this city received $2,132,529 in gold and $5653 in silver.

The Animas Power Company expects to commence operations about March 15. The necessary machinery is now being installed at the substation, located about a mile from Silverton. While the plant will be prepared to furnish 8000 h.p., this capacity can be doubled at small expense, when necessary.

Above Fort Collins surveys for a very large storage reservoir are being made on the Poudre river for the purpose of generating electric power.

Preliminary work on the large improvements on the Minnequa plant of the Colorado Fuel and Iron Company has commenced.

Leadville. March 12.

The output for the month of February amounted to 74,000 tons, a slight falling off from the preceding month. This is accounted for by the lack of smelting facilities, the smelters putting a restriction on several of the large shippers, and the scarcity of railroad cars, also a short month. The big producers took advantage of the restriction of ore shipping to do considerable development work.

Papers of incorporation for the Pawnolas group, Big Evans gulch, have been filed with the Secretary of State, and the the company is known as the Evans Mining Company, with Major A. V. Bohn, president and general manager. The new machinery being placed on the shaft will be in working order this week when the water in the shaft will be baled out. The shaft is 300 ft. deep, and the former leasors state that a good body of iron is to be found at the bottom; this will be determined when the water is out, also as to the

work that will be carried on. Outside of the Mammoth ore shoot that trends through the ground it is the belief that an independent shoot will be found.

The ground at the head of California gulch, lying between the Ibex group and the Lilian, Iowa gulch, will be thoroughly prospected this season. The Concord Mining Company has acquired title to 175 acres of ground, and will sink a shaft on the Cleveland claim.

High-grade galena ore has been opened in the southeast drift of the Brattelboro, Evans gulch, but the work done since encountering the ore shows that the drift is too low, as the mineral is all broken and interspersed with porphyry, showing that it is the bottom of the ore channel; an upraise will be started at once to determine the exact location of the shoot. The north drift from the same level is also in porphyry, and an upraise will be started here also.

The long drift being driven to connect the Penrose with the Coronado is now within 350 ft. of completion, and when the angle is reached where the drift will turn to the west side to get under Coronado shaft, upraising will be done at this point to locate the ore shoot of the Coronado. The water during the past week has decreased 350 gal. per minute, and will be lowered daily from now on as the ground is opened.

Connections have been made with the Grey Eagle shaft and the Penrose, and after a little cleaning up and timbering is done, shipments of manganese will commence and the ore will be shipped to the Illinois steel works at Chicago; the contract calls for 30,000 tons to be delivered to the steel works within a year. A fair rate has been made by the railroads to the East which will permit of the mining company making a profit on the ore.

The fourth distinct manganese ore shoot has been opened in the ground controlled by the Cloud City Mining Company; this time it was opened in the Home Extension territory in an upraise from the main drift connecting the two shafts. The ore is clean and of high grade, and similar to the three shoots. When all of the ground is opened it will permit the company to ship 100 tons daily of this class of ore; it will all go to the steel works at Pueblo.

The work being carried on at the Nil Desperandum, Rock Hill, will probably bring results within a few weeks, as the whole of the south drift is in heavily mineralized contact, some of which, if sorted out, would make good shipping ore. The ground is being thoroughly prospected from an upraise from the main drift.

During the past year bunches of very rich ore were found from time to time in the Nevada claim in South Evans gulch, but the main ore shoot was not encountered, and it has always been considered that the work done was too near the surface. The shaft will now be sunk deeper, probably 150 ft. and from the bottom of the shaft the ground will be explored to open the main ore channel.

The Tucson shaft is now within 125 feet of being completed, and as it goes down the work of sinking becomes slower on account of the amount of water that is daily encountered; the large pump at the 800-ft. level is able to handle the present flow without difficulty. When the sinking is completed it will be 1000 ft. deep, and from this point drifts will be run to open the large body of ore discovered by the diamond drill. The Tucson is owned by the Iron Silver Mining Company.

Socorro, N. M. March 12.

The Independence mine on Bitter Creek, Red River district, has been making extensive improvements, and recently cut two parallel veins carrying tellurides in their cross-cut tunnel. The new mill would be well advanced had the machinery arrived on time. The lead of the Cora Gibson claim is 4 ft. wide and carries gold. The owners of the Memphis claim to have struck a large orebody carrying up to $600 a ton. The Kelly Bros. will soon cut their Blue Rock lode with a cross-cut tunnel; while H. C. Logan hopes by tunneling to soon open an orebody high in copper, in the Alpha and Klondyke claims.

Elizabethtown, Colfax county, which was New Mexico's first incorporated town, is experiencing a revival owing to the approach of the St. Louis, Rocky Mt. & Pacific R. R., the nearest railroad point hitherto having been 53 miles away. In the sixties and seventies several millions in gold came from this district; in large part from the famous Lynch mines which are now to be reopened by Philadelphia capitalists under the direction of Col. F. P. Hunter, an experienced miner from Idaho.

The Gold & Copper Deep Tunnel Co. will soon install an electric drill plant run by electric motor in their tunnel near Mt. Baldy, which is already 1800 ft. long. A discovery of telluride ore has been made on a neighboring claim owned by Raton people.

In Sierra county a 20-mile wagon-road is to be built to Hillsboro to connect with the railway at either Lake Valley or Osceola. This road can be used by the 40-h.p. gasolene traction engine recently purchased by the Sierra Consolidated Gold Co. and intended as a transporter of machinery and supplies for their Snake and Opportunity mines. The former's 3-compartment shaft is 180 ft. deep and the old workings are to be unwatered at once; for the latter's shaft a 40-h.p. gasolene hoister is now en route to hoist ore from a depth of 600 ft. This company has bought the Hager sawmill at Kingston and ordered a 50-stamp mill complete with housing, in order to double their crushing capacity.

The heavy machinery for the Moffit mill is now on the ground and erection will be rushed to completion.

In Rio Arriba county in the Headstone district, the Dixie Queen Mining Co. is working the Red Jacket claim so as to get enough ore ahead to insure a supply for its new 50-ton Huntington mill, when it starts in the spring. The King William Mining Company has put in 3 dams on its Fairview claim to secure ample water for their placers.

In the Bromide district, the Tusas Co. of Pontiac, Mich., has opened in their Iron Clad vein a large body of quartz carrying lead gold and silver and has let a contract to R. W. Tandy to develop the Independence group. This company has also completed plans and let machinery contracts for a new mill and has installed a hydraulic ram on Susas creek. The Nome-Montana-New Mexico Company has done enough on the Nome lode to make a good showing of copper and lead sulphides.

Joplin, Mo. March 10.

George Donallan, of Webb City, has purchased the famous "Log Cabin" lease at Duenweg and will in the future look after it personally. It is one of the greatest lead producing properties in the entire district.

J. C. Stewart, of Webb City, acting for the Corra Latta Mining Company, has closed a deal for the sale of that property, located in East Joplin, consisting of 80 acres, to A. B. McConnell, of Joplin. The consideration was $20,000.

The Rochester Mining Company at Carterville holds the record for the hoisting of dirt, for a single shift, in this district. On February 22, they pulled 743 tubs, of 1000 pounds each, in 8 hours. The Osceola Mining Company, of Webb City, formerly held the record, which was 732 tubs.

A. E. Bendelari, of Joplin, is drilling a lease on the Wilmouth land, lying near the Water Works station, northeast of Webb City.

Chapman & Lennon have encountered a splendid run of zinc ore in several drill holes they have sunk on the Nevada ground west of the Brabford-Kansas City Company's mill.

M. H. Roberts, manager of the Belville Land and Mining Company's property at Belville has discovered a big body of ore, in drilling, at the 60-foot level and the drill continued in ore to 100 feet. The Kathleen mine, owned principally by Prof. George E. Ladd, of the Rolla School of Mines, is on this same land and is producing considerable ore at the present time.

Allen Hardy, of Webb City, representing the Federated Mines and Milling Company, which is very heavily interested in this district, has purchased the Tusing

& Son prospect on the Edgar county land, west of Joplin. The consideration was $40,000.

The Condor Mining Company, composed of Chicago parties, and operating on a 16-lot lease on the Cunningham land at Chitwood, has encountered a rich run of lead ore at a depth of 105 feet. According to the numerous drill holes on the lease there is a splendid run of zinc ore beneath the lead.

The Evansville Mining Company, composed of Evansville, Indiana, parties, is erecting a modern concentrating plant on its lease on the Henderson land, west of Blendville.

Calumet, Mich. Mar. 10.

Lake Superior copper production in February was only 17,350,000 lb., the smallest of any month for the last year and a half. Accidents at some of the properties and the shortness of the month were responsible for the poor showing.

The Tamarack is producing only a third of its usual amount of copper, because of the fire which put three of its shafts out of service. While the fire was extinguished some time ago, the gases generated by the burning timbers still linger underground in the workings, and prevent the resumption of operations. Production is confined to No. 3 shaft, where increased forces are working. An improved grade of rock has been encountered in the lower levels of No. 3 shaft lately and this contributes to offset the decreased production of the other shafts. Preparatons are under way for the resumption of work in No. 5 shaft. The drifts connecting No. 5 with No. 2 shaft, where the recent fire originated, are being blocked up. These openings are on the 29 and 31 levels. With them closed the noxious gases in Nos. 1 and 2 shafts can not gain entrance to No. 5, and operations at the latter can be carried forward without delay.

Air blasts underground in some of its older workings caused a decrease in the production of the Quincy mine last month. Large quantities of rock were shaken down and considerable time was consumed placing the openings in normal condition.

Indications point to a refined copper yield of approximately 6,000,000 lb. by the Franklin Mining Company this year. The improvement in the quality of the conglomerate lode in the bottom workings of the Junior branch of the mine is encouraging. No. 1 shaft is sinking to the 22 level. No. 2 shaft is approaching the 14 level and a drift extended 400 ft. beyond the line of the shaft at that depth reveals a good grade of rock. North from No. 1 shaft drifts are opening on the 16 to 20 levels, inclusive, with encouraging ground in sight. Rock shipments from the Junior branch average 1,100 tons daily. The Franklin mine is now operating 30 power drills in its various shafts and openings. The crosscut eastward on the fourth level of No. 1 shaft is progressing at the rate of upward of 100 ft. a month, one drill being in commission there.

Sinking in the new shaft opening on the Arcadian property is down 140 ft. The identity of the lode which is being developed has not been established, but it presents a fairly encouraging appearance, some copper being noticeable in the rock so far exposed. At a depth of 200 ft. it is proposed to crosscut eastward to tap an amygdaloid bed paralleling the one now under investigation, at a distance of 100 feet.

The Champion Copper Company recently purchased three simple stamp head cylinders from the Trimountain Mining Company to apply to the heads in its mill at Freda. The cross-compound system of steam cylinders is to be replaced with simple steam cylinders, as the latter will prove more economical under the conditions existing at the plant.

Hartshorne, Ind. Ter. March 13.

In this section, the indications are strongly for a strike in the coal mines on April 1. The rank and file of the miners are almost all opposed to a strike, and feel that conditions do not warrant the demands made by the officers of the United Mine Workers of America; but at the same time the feeling seems to prevail that if the strike is called the men will come out. If the situation is not changed by the coming convention, called at the instance of President Roosevelt, there will probably be a strike on April 1 in the Southwest, at least. Even if a settlement is arrived at by the Indianapolis Convention, there are so many local differences to adjust that there will hardly be time to have all terms arranged by April 1, consequently a short suspension of work at least, seems inevitable.

There will probably be some small local strikes, even in the event of a general settlement, on account of the varied conditions in this section, before matters settle down again to a smooth working basis.

Indianapolis. March 10.

A call has been made for the re-assembling of the Mine Workers of the States of Ohio, Indiana, Illinois and western Pennsylvania in this city, March 15. The call is made at the request of the coal operators of the four States in deference to the wishes of President Roosevelt. While the questions between the miners and operators have not been wholly adjusted, and while both interests disclaim having entered into any agreement, it now seems probable that there will be no general strike. It is practically understood that the bituminous operators at a conference held in Pittsburg agreed to restore wages to the level of 1903. Two years ago the miners consented to a reduction of 5.55 per cent. This year they asked not only that the old rate be restored, but that there be a considerable advance over it. Now it is thought the conference to be held in this city March 19 will result in both sides agreeing to the restoration of the old rate. This will probably carry with it a partial recognition of the union, a widening of the provisions of the late strike commission's award, an increase in the wages of certain underpaid classes of labor about the mines, and a substitution of three district boards of conciliation for the one general board. Thus the prospect of averting the threatened strike is encouraging. The operators have been influenced doubtless by the request of the President as well as the pressure which is being brought to bear by great commercial interests that are protesting against having their coal supply cut off and the consequent interruption of business in case of a strike. However, there is by no means a certainty that there will not be a strike.

According to many of the Indiana operators there has not been the least change in their position, and it is a question whether the apparent or reputed agreement between Mr. Robbins and Mr. Mitchell will be ratified. There is such a bitterness among the Western operators as may make the conference to be held on the 19th of even greater interest and excitement than that which was adjourned Feb. 2.

In discussing the situation President J. C. Kolsem, of the Indiana Coal Operators' Association, said that the operators have not yet agreed to hold a joint conference with the miners. "We have only agreed to meet in Indianapolis, March 19, and go over the situation and decide whether or not it will be worth while to meet the miners." Mr. Kolsem said "that the operators would regret to see a strike, but rather than to concede anything that will increase the cost of producing coal we would prefer a strike. The reason for our feeling this way is that the large consumers, on whom we depend for the bulk of our business, insist that they cannot pay an advance in prices of coal at present, since manufacturers claim that they dare not increase the cost of their products to the public because they are already too high."

In commenting on the situation the *Mine Workers' Journal* says: "It seems highly probable that the most gigantic industrial war ever known has been averted. However, we desire to warn the miners that we are not out of the woods yet. . . . It is known that many operators, particularly in Indiana and Illinois, really want a suspension, and whether they will yield or not is not known." The general view of the public is that the objecting operators are trying to maintain the state of uncertainty so as to keep the coal market toned up, and that their opposition will suddenly collapse under the great pressure of the March 19 meeting.

The Indiana railroads are taking no chances on there not being a strike. All of of them are accumulating immense quantities of coal.

The decision of the United States Supreme Court in the coal-rate case of the Chesapeake & Ohio will have a direct bearing on the Indiana coal merger situation, as nearly half of the coal properties in this State are now controlled by the railroad interests under the recent merger of companies.

The Worsham-Newburg Coal Mining Company, capitalized at $10,000, Ludson Worsham, W. J. Lewis and others, directors, and the Banner Coal Mining Company, capitalized at $10,000, Charles H. Schinnell, Henry Korff and others, directors—both of Evansville—have been incorporated to do a coal-mining business in southern Indiana.

Birmingham. March 5.

A record was made in the probate court the past week of a meeting held by the board of directors and stockholders of the Woodward Iron Company at which an increase in the capital stock in that company was made from $2,000,000 to $3,000,000. While no statements are made it is believed that the extra capital will be used in new developments including a steel plant, pipe plant, or a drawn tube works to be constructed near the furnace plant at Woodward.

The Kilby Frog and Switch Company will begin operations at its plant at North Birmingham next week. This concern has orders on hand which will keep it busy for some little time.

The plant of the American Cast Iron Pipe Company at North Birmingham is nearing completion and should be ready for operation within the next month or two.

Work has been started on the big foundry and machine shops at East Birmingham to be put up by Payne & Joubert, of New Orleans.

Scranton. March 13.

Consternation was caused in the anthracite region when it became known that the operators had decided to reject all the terms offered by the miners. The surprise was manifested chiefly by the general public. The miners said but little. Some time ago it was stated in this department of the JOURNAL that it would not be surprising if the miners would be contented with a renewal of the present agreement. That will probably be the result of the negotiations. The only feature that may prevent this will be the uncertainty in the bituminous fields. Among the miners in the anthracite field the overwhelming sentiment is against a strike. They would avoid a strike by accepting a continuation of the agreement and without receiving any concessions from the operators. They are more prosperous at present than they have been in years. There is no special demand and the questions of the eight-hour day and the recognition of the union are largely sentiments which they believe can well wait, rather than risk an industrial conflict, by which they would be the main losers. If the affairs in the soft-coal fields are amicably settled there will not, from the miners' standpoint, be any strike in the hard-coal territory.

The unfortunate strike at the Jermyn colliery in Rendham remains unsettled, and its continuance has aroused great public sentiment, all the newspapers criticizing the owners, who, it is claimed, are making no effort whatever to make an amicable arrangement. Negotiations have been afoot for some time to sell the property to the Erie, the sum of $2,500,000 being asked. The Erie has made an offer of a less sum, owing to a dispute as to the amount of coal unmined. Last week the superintendent met a committee of the miners and agreed upon a settlement which he promised to urge upon the owners, but their reply is still awaited.

The anthracite production for the month of February totaled 4,712,099 tons, being considerably more than that for the corresponding month of last year.

The Miners' Mill colliery has been sold to Peale Bros., of New York. The company was capitalized at $70,000, but the stack has doubled in value. The colliery is connected with the Jersey Central and the Lehigh Valley railroads.

Madeira, Hill & Co., of Philadelphia, have purchased from the Diamond Coal Land Company a small triangular tract of land between the Harleigh workings of the Madeira colliery and the Markle holdings for the sum of $57,000. The company will carry on extensive stripping operations in spring.

A vein of anthracite coal has been found in Iron Mountain in Hughesville, Lycoming county. A slope 100 ft. in depth has been sunk.

Negotiations are in progress for the sale of the Morss Hill Coal Company, Carbondale, which operates the old Franklin breaker.

Superintendent W. D. Zehnder, of the Lehigh Coal and Navigation Company, has notified the mine foremen that all employees must be vaccinated. Each must file the certificate with the mine boss.

Commissioner Charles Neill has announced that the rate of wages in the anthracite field for the month of March will be 5 per cent. above the basis.

The Sheafer tract near Pottsville has been sold to the Shanferoke Coal Company, the price being $2,500,000. The sale comprised five separate tracts of valuable coal land containing in all 1166 acres. But little is known of the company which purchased the lands, but it is believed to be acting in the interests of one of the larger companies.

Last week saw the very last vestige of the old Merriam colliery in Mt. Carmel disappear. It was one of the landmarks of the region and once the center of a busy community. The coal was exhausted some time ago.

Governor Pennypacker vetoed the resolution calling for an investigation of the anthracite railroads which also engaged in the business of mining coal. The resolutions were adopted at a special session and the Governor ruled that they were not germane to the call for the session. The resolution was introduced soon after the railroads decided not to issue free passes.

Toronto. March 15.

Inspector Corkill, of the Provincial Bureau of Mines, has returned from an official trip covering the mining districts west of Sudbury on the main line of the Canadian Pacific Railway. He reports that at the Atikokan iron mines, 135 miles west of Port Arthur, a large plant is being installed and preparations are being made to begin taking out ore in about two months. At the Laurentian gold mine on upper Lake Manitou, where rich finds have recently been made, a stamp mill is being installed, and there is rich ore in sight. Owing to the discoveries at the Laurentian several other mines in the locality are now being re-worked. The Sultana gold mine in the Lake of the Woods region is being steadily worked.

The output of portland cement will be largely increased this season by reason of the greatly augmented demand, and the price is advancing. Tenders for a supply for civic purposes were recently called for by the city of Hamilton. The lowest of six tenders received was at $1.78 per barrel; whereas the price paid last season by the city was $1.55½. The largest shipment of cement yet made to the West was recently forwarded by the International Portland Cement Company of Ottawa. It consisted of a full trainload, amounting to 960 tons.

A good deal of anxiety is felt in Government circles over the probability of an outbreak of fever at Cobalt when the warm weather sets in, on account of the unsanitary condition of the camp. The natural drainage of the locality is toward Cobalt lake, which will be badly contaminated by the spring freshets. The only other source of water supply is a spring, which is also infected. Unless arrangements are made for obtaining drinking water from some other source, and for the disposal of sewage, serious consequences are likely to result.

The trains arriving daily at Cobalt are overcrowded, and the Temiskaming & Northern Ontario Railway will shortly put on two trains a day to accommodate the rush. The entire township of Coleman is now covered by applications and numerous locations in Bucke have recently been staked out. It is expected that investigation by the mining inspectors will result in canceling many of these claims and giving prospectors a chance.

At the annual meeting of the Dominion Coal Company in Montreal on the 28th ult. it was announced that the contract with the New England Gas and Coke Company would cease in October, 1907, after which date the slack coal would by agreement go to the Dominion Iron and Steel Company in place of run-of-mine coal. This would give them a quantity of the latter to sell at a paying figure. The contract between the Dominion Coal Company and the Dominion Iron and Steel Company, which has proved unprofitable, is subject to revision every five years, and the present basis of sale has two years to run, at the expiration of which time a new price will be made.

The Concrete Pole Company has erected at St. Catharines, Ont., for the Lincoln Electric Light and Power Company a reinforced concrete pole of an unusual size. It is 150 feet high and 31 inches square at the base, tapering toward the top. It is designed to support the Electric Company's lines over the Welland canal, and is made to sustain a horizontal pull of 2000 lb. in addition to resisting wind pressure.

The following companies have been incorporated under the laws of Ontario:

Foster Cobalt Mining Company, Ltd., Toronto; capital, $1,000,000. Provisional directors: Charles W. Kerr, Charles S. MacInnes, Christopher C. Robinson, Joseph H. Spencer and Wm. E. Watson.

Silver Star Mining Company, Ltd., New Liskeard; capital, $40,000. Provisional directors: Wm. H. Rice, William J. Evans, Fred W. Ferguson, William V. Cragg and Hedley S. Hennessy.

Wainfleet Natural Gas Company, Ltd., Port Colborne; capital, $100,000. Provisional directors: DeWitt Carter, John H. Smith and George H. Smith.

Ben Allen Portland Cement Company, Ltd., Owen sound; capital, $500,000. Provisional directors: Charles Payton, John McMillan, John N. Ferguson, James E. Day and Edward V. O'Sullivan.

The Saginaw Oil and Gas Company, incorporated under the laws of Arizona, has been licensed to do business in Ontario on a capital not to exceed $40,000.

Victoria, B. C. Feb. 28.

Nelson—District lead smelters have reduced the freight and treatment charges on silver-lead ores from $15 to $12 per ton. It is expected this reduction will encourage the working of a number of properties. The chief difficulty in some parts of the Kootenay districts is the cost of getting the ores down the mountains from the mines to rail or steamer.

From Ymir comes information that as production has been overtaking development, the directors of the Ymir Gold Mines, Ltd., have cabled instructions from London to suspend temporarily milling and cyaniding operations at the company's 80-stamp mill and cyanide works at Ymir. It is stated that the mine looks better now than at any previous time in its history, and that at the expiration of a couple of months, which is the period the mill is to remain closed, development will have been sufficiently advanced to admit of the mill being run at as full capacity as the available water supply will allow.

Rossland—The Le Roi Mining Company and the Canadian Consolidated Mines, Ltd., have been proceeded against by the inspector of metalliferous mines on a charge of having induced and persuaded engineers in their employ, respectively, to work 12 hours instead of eight, the latter being the statutory number of hours that may be worked. Each of the defendant companies was fined $25 and costs.

Revelstoke—The American Hydraulic Company has been reorganized and the authorized capital increased from $50,000 to $500,000. It is stated that the whole of the increased capital is to be treasury stock, and that much of it has been underwritten at Lafayette, Indiana. The company's property is described as the chief hydraulic property in the district known as the Big Bend, lying north of Revelstoke. Another monitor is to be added to the two already on the property and hydraulicking is to be commenced as early in the spring as practicable. A. E. Bradley will be in charge of operations.

The Beaver Mining Company, an English organization owning mineral claims on the mountain divide between the Spillimacheen section of northeast Kootenay and the Duncan section of west Kootenay, is reported to have become interested in a method of locating orebodies by magnetic indication and to be sending experts out from England to test this system on the company's claims.

Alberta—The Canadian-American Coal and Coke Company intends to install a new operating plant at its coal mine at Frank, southwest Alberta. The company's general manager, F. A. Hill, says that the new works will include a permanent tipple equal to handling 2000 tons of coal per diem, car haul, box-car loader, machinery and equipment for power-house, and an extension of the existing rope-haulage system. The tipple is to be provided with two dumps—one for run-of-mine coal and the other to be equipped with shaking screens, picking belt, etc. The machinery for the tipple has been ordered and should reach the mine within the next three months. The work of construction is to be commenced about April 1. The cost of the intended additions and improvements is estimated at about $60,000. The output of the company's mine is at present 600 tons per day, but there is an available market for 1000 tons, which quantity will be shipped daily after the new plant is in running order. The company now has 175 men on its payroll. The Canadian Pacific is increasing its trackage at this mine and intends to have facilities here for 120 cars.

Mexico. March 10.

What promises to be a long and bitter fight is that instituted last week by Ernest DuBois, manager of the Mexican Gold and Recovery Company, against the Guanajuato Reduction and Mines Company for the unauthorized use of the cyanide process for the extraction of the gold and silver values from its ores. The company which Mr. DuBois represents controls by patents, issued from the Mexican Government, the McArthur-Forrest cyanide process in Mexico; so when Mr. DuBois learned of the experimental plant of the Guanajuato Reduction and Mines Company at Bustas, near Guanajuato, he proceeded thither with attorneys Garito and Riqueño from Mexico City and through Judge Arizmandi, of the first criminal court of Guanajuato, had the plant and employees examined, and by legal act had the plant then closed and sealed. C. W. Van Law, manager of the Guanajuato Reduction and Mines Company, proceeded at once to the City of Mexico to take legal action, claiming that the Mexico Gold and Silver Recovery Company has no legal right to control the cyanide process in Mexico. He has determined to fight the matter to the bitter end. This will no doubt be made a test case, and it is understood that the Guanajuato Consolidated Mining and Milling Company has had its cyanide plant in operation for more than a year without authorization from the DuBois company; so it, together with the Perigrinas Mining and Milling Company (of Guanajuato), and the Guanajuato Amalgamated Gold Mines Company, will join the Guanajuato Reduction and Mines Company in this fight. The only surprising feature is that such a fight has not been opened long ago, for this Mexico Gold and Silver Recovery Company has for years been extorting royalties from every cyanide mill, large or small, in the Republic; and if I am correctly informed, this country and Australia are the only places where the McArthur-Forrest patents have held. The fight now on, therefore, should be of special interest to the mining world, though more particularly, of course, to the mining men of Mexico, where the burden has been so long borne, and will continue to be, if the Guanajuatos companies lose. I believe a similar fight was started in Mexico some ten years ago, but the mining company was not sufficiently strong financially to continue the suit and therefore lost. This has, perhaps, kept others from risking a fight; but the companies now interested are rich and strong, and mining men hope they may win and make the cyanide process free and open to all in the republic

While in Guanajuato on the preceding business, it is understood that Mr. Riqueña will confer with Alberto Robles, secretary of the mining junta of Guanajuato with respect to the mining convention to meet in Mexico City about May 15, in the offices of Pabla Martinez del Rio, to again

consider and work for the permanent establishment of a chamber of mines, which has now been under discussion for so long.

In the State of Durango considerable interest is manifested in the Guanacevi tunnel, driven by Hilario Lozoya, 2½x3½ meters, which is now in 30 meters, and has cut several stringers, but must be driven another 20 meters before striking the first vein shown by the shaft. In the 3000 meters which the tunnel is to be driven it is claimed 20 known veins will be cut, the sixteenth of which is 2 ft. wide and runs about 0.3 oz. in gold and averages 250 oz. silver to the ton. For this work it is said Mr. Lozoya has raised $5,000,000 gold, and it is hoped to have the tunnel completed in 3 years.

At Indé, Durango, Wm. Benton has sold his Guadalupe gold mine to British capitlists represesented by F. M. Sherwood, who had the property examined by F. L. Bosqui, the cyanide expert from San Francisco, and the contract is thought to have been given for a 100-stamp wet-crushing cyanide mill, which will be driven by electric power from the Sistan river, but five miles distant. This, together with other new work, as the custom smelter of David Gough, the smelter at La Roca mine, the mill on the Potrillo, and others in contemplation, has caused the Durango Central Railroad to consider the extension of its road on from Descubridora, past the Cinco de Mayo copper mines at Mimbre into the Indé district.

Sydney, N. S. W. Jan. 15.

The continuous advance in the market value of shares in the Broken Hill mines has been the prominent feature of the past month's operations. The selling value of the 10 mines working at the Broken Hill rose during the year 1905 from £4,214,000 to £8,101,000. The increase in the price of silver and lead, improved recoveries and augmented ore reserves have contributed in a great measure to the confidence shown by investors; but the chief factor is unquestionably the solution of the zinc problem. This will be realized when it is stated that the rise in silver and lead represents an increase of 19s. 7½d. per ton in the value of the output, while the zinc now recovered gives an additional revenue of fully £3 per ton. Developments underground during the year have proved very satisfactory. In the British mine an orebody was located which it is estimated will yield 500,000 tons of high-grade sulphides, and recent progressive work has proved beyond all doubt that this orebody extends into both the Junction North and the North mines. In the Proprietary mine the lode has been proved down to 1100 ft. and is over 70 ft. wide, while its value at this depth is shown to be fully maintained. The December output from the zinc concentrating plant of this company was 5700 tons of concentrate, obtained from 15,500 tons of tailing. At this rate the annual output would amount to some 68,000 tons of concentrate, which on an average value of 40 per cent. zinc would represent a total of 27,200 tons of zinc. A considerable deduction has of course to be made for losses in treatment; but the figures have great significance when it is considered that to maintain this output the company would be using less than half the quantity of tailing produced during the year.

The Broken Hill Block 10 Company has declared a dividend of 4s. per share and a bonus of 4s. a share, and placed £22,500 to the credit of the reserve fund. This is the largest dividend the company has paid and brings the profits distributed up to £975,000. This company has accepted the tender of the Gillies Sulphide Concentrating Company for 100,000 tons of zinc-bearing residue. The acceptance of this tender marks the advent of another process along with the Potter, the Delprat and the DeBavay for the recovery of zinc sulphide from the Broken Hill residue.

The North Broken Hill Company has declared a dividend of 2s. per share, absorbing £13,000. The British Broken Hill Company also announces a net profit of £28,000 during the last half year, which, with the amount brought forward, made a total available for distribution of £35,365.

The gold yield from the Bendigo field in Victoria during December amounted to 25,527 oz., and is the largest return for any one month during the past 29 years. The large amount spent in prospecting and development work during the year 1905 should result in a very substantial increase being shown in the production. As the reef intersected in the New Chum Railway shaft at a depth of 4262 ft. in the winze could not be worked further on account of water, the shaft is being continued.

London. March 10.

In a recent letter I mentioned that the Nile Valley Company, owning the Um Garaiart mine in Egypt, was being reconstructed in order to provide fresh capital. Since then a few dissentient shareholders have appealed to the Chancery Court, with the result that the judge has ruled that the scheme of reconstruction is invalid in law. What the company will do as an alternative remains to be seen, but that is not the question I desire to call attention to now. The result of the judgment is to upset preconceived notions and customs with regard to reconstruction. Without entering into legal details, it may be said briefly that the usual plan pursued in England when companies require more capital is to wind up and sell the possessions to a newly formed company, the purchase consideration being partly-paid shares in the new company. These new shares are acquired by the liquidator of the old company and distributed among the shareholders. According to law it requires a three-fourths majority of shareholders to confirm the resolutions for winding up a company, and by custom it was often taken for granted that the terms of reconstruction could be carried in the same way. Those shareholders who did not agree to the reconstruction and did not want to pay up any more capital, did not accept the new shares, and the liquidator sold them for what he could get—sometimes distributing the proceeds to the dissentient shareholders and sometimes not, according to the resolutions passed at the winding up. Two of the dissentient shareholders in the Nile Valley Company decided to test the legality of these proceedings, with the result already mentioned. The whole question turns on the provisions of the memorandum of association of the company that is being wound up. No doubt the lawyers will find some way of getting over the difficulty, and of forcing dissentient shareholders either to forfeit their shares or pay up the assessment; but in the meantime the effect of the judgment is to prevent the squeezing of the minority.

The Edison Ore Milling Syndicate having succeeded in placing the Dunderland Iron Ore Company in Norway practically on its working legs, is now turning its attention to other schemes, the chief of which is the Edison portland cement process. This process is already at work at Stewartsville and is reported to be a success. The English company is negotiating for land not far from London, where the raw material is found, and will before long start a works there.

In a recent issue I referred to the Champion Reef of India curtailing its output of ore owing to developments not showing well. Another of the Mysore group, the Coromandel, has just issued its yearly report, from which it is gathered that the exploring work has not yet rewarded the shareholders. The company was originally formed in 1892 to acquire part of the Champion Reef property. At first the prognostications of the engineers were amply confirmed, but in a very short time the workings entered poor ground and in spite of repeated subscriptions of new capital no discoveries of permanent value have as yet been made. Work is still going on but as the property has been so extensively explored with no result, the possibility of finding payable orebodies within the country owned by the company is not very hopeful.

The Exploration Company's report for 1905 shows that the company is gradually recovering from the acute crisis of four years ago. The splitting of the old company's business into two independent companies, one to take over the worthless or rapidly deteriorating assets, and the other to acquire the live business of the company, has been a useful move, for the present Exploration Company is now working on the basis and method for which the old company was originally formed, and is cut off entirely from the unfortunate speculations introduced between the times of the late Hamilton Smith and the present chairman, R. T. Bayliss.

General Mining News.

ARIZONA.

COCHISE COUNTY.

The Shattuck Arizona Mining Company has closed a contract with the Allis-Chalmers Company for a double drum duplex direct acting Corliss hoisting engine. The steam end of this hoist will consist of two Corliss engines of the heavy duty type, having cylinders 20x43 in., the engine being designed to withstand the excessive strains incident to hoisting work.

The hoist will operate at 125 lb. steam presure, and at this pressure will handle continuously a total unbalanced load of 15,000 lb. at a hoisting speed of 2000 ft. per minute.

The engine is so designed that the steam pressure may be later raised to 150 ft., and is proportioned to handle the increased load with this pressure will make possible from the depths and at the speed above mentioned. There will be two drums 7 ft. in diameter having turned grooves, each holding 1500 ft. of 1⅛-in. rope. These drums will be loose on the drum shaft, and served by powerful friction clutches. The hoist will be entirely steam operated, and embodies the latest ideas in hoisting practice. Local conditions in this district surrounding previous installations of this size and character have precluded the use of drums, all the larger hoists being of the reel type. Consequently the operation of the new hoist will be watched with interest by mining men.

SANTA CRUZ COUNTY.

The Arizona Consolidated Mining Company is working the Oro Blanco and Tres Amigos mine. The Gold Bullion mine is being negotiated for by Los Angeles people. Two or three other companies expect to begin operations in the vicinity of Old Glory, this county, during March. Prospects are considered favorable for a busy summer in this county.

CALIFORNIA.

AMADOR COUNTY.

Kennedy Mill and Mining Company—In this mine at Jackson, Webb Smith, superintendent, they are drifting on the 2850 level to encounter the west or footwall ledge. The 100 stamps of the mill are kept steadily dropping.

South Eureka Mining Company—The new electric pump, with a lift of over 1800 feet has been successfully operated for over two weeks, handling most of the water from the Central and South Eureka mines.

CALAVERAS COUNTY.

Duck Bar Mining Company—This company has been incorporated at Stockton, with J. E. Matteson of Murphy, and A. F. Rocken and W. H. Matteson of Stockton as directors. The principal place of operation will be in Calaveras and Tuolumne counties. The old Duck Bar claim is on the Stanislaus river below Collingville, at which point the river bed has been mined in a primitive way for years. It is now intended to begin systematic work in considerable ground to which title has been secured by the new company.

Voinich Mining Company—The new 40-stamp mill on this mine has been started up. The shaft is down 800 ft. and milling ore will come from the 500-600 and 700 levels. The ore is free milling and carried a heavy percentage of sulphurets of good grade.

EL DORADO COUNTY.

New Highland Mining Company—This company is making the necessary arrangements to resume work on the Mameluke Hill mine.

Mill—Forni, Smith & Coster, have received the machinery for a new 4-stamp mill which is being set up on their mine near Georgetown.

Sebastopol—At this mine near Balderston's station, C. M. Jordan has struck pay gravel at the end of the 500-ft. tunnel, after some months of development work.

INYO COUNTY.

Keynote Mining Company—This company at Lone Pine has several thousand tons of milling ore ready for treatment as soon as the mill is completed. The present five-stamp mill runs constantly and furnishes enough bullion to pay all expenses.

Strike—R. E. Lambertson and F. H. Tilson, have found a four-foot high-grade ledge in Goler cañon, 16 miles south of Ballarat. This seven miles east of the recent Sanford and Burton strike.

KERN COUNTY.

Orphan Girl—This mine in the Stringer district near Randsburg has been purchased by Chancelor & Canfield. The ore in the bottom of the 400-ft. shaft though in a small vein, is of very high grade.

Butte Lode—The ledge in this mine, Randsburg, has been cut after drifting 800 feet in hard rock, in the 540-ft. level. It is five feet wide and shows values of about $100 per ton.

MARIPOSA COUNTY.

Three Tree Mine—This property near Hornitos has lately changed ownership and is being equipped with new machinery. The electric power line has already been installed.

MONO COUNTY.

Bonded—E. S. Smith has bonded in Bodie the Cons. Pacific, owned by Thos. Colligan; Midnight and Flagstaff, owned by T. & J. S. Cain and New Standard, owned by John Long. The bond calls for $12,000 worth of work to be done in four months.

True Friend—This group in Masonic district has been bonded by a Utah company but active operations will shortly begin. Very little work has been done on the claim but considerable high-grade rock is in sight.

NEVADA COUNTY.

California Mutual Gold Mining Company—This company has obtained the deed for the Oro Grande quartz mine in Sleep Hollow, Remington Hill district, the purchase including the water-right, mill, etc. A cross-cut tunnel is to be extended from Tiger ravine to tap the ledge so as to give 350 ft. of backs. The principal stockholders of this company are J. G. Hickey, of the U. S. Hotel, Boston, Frank Cullen, of the Windsor Hotel, Jacksonville, Florida, and A. Averill, of the Yates Hotel, Syracuse, N. Y.

Morayanda—This mine near Newtown, west of Nevada City, has been sold to San Francisco and Kansas City men, who will increase the crew and carry on extensive development work.

Posey Canyon Gravel Mining Company—This company has been incorporated with J. S. Goodwin, R. Richardson, I. Haas, John and Wm. Grant as directors. The property is west of Grass Valley and was bonded from Mrs. Maywhort. A tunnel is to be started at once to develop the gravel channel.

PLUMAS COUNTY.

Bliss—This ledge near Wyandotte known also as the Rutherford and Stevenson is being developed by a San Francisco Company. The mine was found as far back as 1850 but has long been idle.

SIERRA COUNTY.

Alaska Mine—The new drain tunnel of this mine at Pike City has finally tapped the shaft which is now drained to the tunnel levels. This mine is one of the wettest in the State.

New Monte Cristo—This old mine at Anderson Hill (formerly the Johnston,) which has been idle for 30 years until last fall, is being reopened by W. H. Miller and others. The channel is believed to be the same as in the old Nebraska mine.

COLORADO.

BOULDER COUNTY.

Tungsten properties sold—The Trevarthon ranch, together with 18 tungsten claims, have been sold by George Collins and associates, of Denver, to H. E. McKenna, a metallurgist of the Firth-Sterling Steel Company, of Pittsburg, Penn.; the consideration being reported as $32,000.

Good Morning Tunnel—A contract of 1000 ft. has been let in this tunnel at Wall Street, Colo., and Engineer Fred Mitchell reports that a compressor plant is to be installed during the next 30 or 60 days.

Champion—A streak of high-grade ore carrying values of $500 per ton has been opened in a tunnel on Woodland mountain by the owner, J. R. Campbell, of Eldora, which is one of the best strikes made in that section for years.

Smuggler—An air-compressor plant, capable of running eight drills, is being installed at this mine at Balarat, Colo.

Boulder County Tungsten Company—Eastern people are reported to have taken a lease on its tungsten group and will install machinery at an early date. Property is located near Nederland.

Belle—A company is being formed to operate this group near Jamestown and machinery will be needed for its development.

GILPIN COUNTY.

Saratoga—The orebody has been cut in the Newhouse tunnel lateral, the orebody being about 2 ft. wide and carrying values of 2½ oz. gold, besides silver and copper values. The water is receding since work was resumed in the lateral, and arrangements will be made to increase the working force. John Owens, of Idaho Springs, is manager.

Old Guard Consolidated Mines Company—E. Chapin Guard, manager, has taken a five years' lease and bond on the Engelburg group, on Winnebago hill, together with the Eagle mill, on North Clear creek, and arrangements are being made to install machinery and erect new shaft buildings.

Amazon M. & M. Company—Articles of incorporation have been filed showing capital stock of $2,000,000. Company has holdings in Wisconsin district and intends to install machinery this spring. W. W. Smith, Tolland, Colo., is in charge of operations.

Hattie Myrtle Group—Chicago people have taken a two years' lease and bond on this property in Elkhorn gulch and are intending erecting buildings and installing machinery. R. R. Wright, Central City, is manager.

Faraday Mining Company—Articles of incorporation, showing capital stock of $100,000, have been filed. The company has acquired the Faraday claim in Russell district and is arranging for the installation of machinery. T. R. Cudahy, Central City, is manager.

Bald Mountain M. & D. Company—L. D. Bloom, Russell Gulch, is manager for Illinois and Iowa associates interested in a group of claims west of Russell Gulch district. The company proposes to install machinery shortly.

Pendleton—A. A. Johnson, of Denver, has taken a lease and bond on this mine in Russell district and machinery is being installed, and a shaft building will be erected. J. R. Woods, Russell Gulch, is superintendent.

Jupiter-Belmont Leasing Company—Denver people are interested and have installed new machinery and put up new shaft building. It is proposed to sink the shaft several hundred feet deeper. J. C. Williams, Russell Gulch, is superintendent.

Fairfield—Baltimore, Md., people are interested in the installation of new machinery and erection of new buildings, and will carry on considerable amount of sinking. Dr. W. M. Nickerson, Tabor Opera House building, Denver, is manager. An air-compressor plant may be purchased at an early date.

Santiago Mill—Expert mill men are taking out the old machinery at this mill at Georgetown for the purpose of equipping it with a new plant and adding to its capacity. The mill will be run on ores from the Santiago mine in East Argentine and improvements will make it of a 100-ton daily capacity. The Santiago Consolidated Mining Company is owner.

Waltham M. & M. Company—This company has taken a lease and bond for 3 years on the Comstock group near Idaho Springs, consideration being $175,000. The company will cyanide the ores of the property, as successful tests along that line have been made.

Black Eagle—High-grade ore carrying values as high as $700 per ton, principally in silver and lead, has been opened this week. W. A. Short, Idaho Springs, is manager, and the mine is paying regular dividends.

Old Queen—Idaho Springs people have formed a pool to work this property through the Newhouse tunnel, and already shipping is being carried on.

Newhouse Tunnel—Jesse J. May, Idaho Springs, manager, is responsible for the report that new equipment is to be added for use in the tunnel workings, consisting of a new generator plant, as well as new machine and blacksmith shops.

United Hydro-Electric Company—This company has placed an order for a 500-kw. Parsons-Westinghouse steam turbine for its plant at Georgetown.

Conqueror Mining and Reduction Company—Massachusetts capital is chiefly interested in the recent organization of this company and for the operation on an extensive scale of the Conqueror group at Empire. New machinery is to be installed, it is reported.

IDAHO.

IDAHO COUNTY.

Elk Trail Mining Company—This company controls 640 acres of placer land at the intersection of the Crooked and Clear Water rivers. The gravel is estimated to carry $1.50 per sq. yard. Over five miles of flume has been constructed to carry water on to the property. Actual mining operations will be commenced shortly. The officers of this company are F. C. Bryan, president; Frank J. Day, treasurer; Ed. A. Beekman, secretary; all are residents of Washington, D. C. The main office is at Elk City, Idaho, E. H. Farr, superintendent.

MICHIGAN.

The following changes are announced, consequent on the death of the late John Stanton:

Joseph E. Gay, president of the Atlantic Mining Company, has been elected president of the Wolverine, Mohawk and Michigan Mining companies, succeeding the late John Stanton.

William A. Paine will succeed Mr. Stanton as president of the Baltic Mining Company. Frederick Stanwood will succeed John R. Stanton as secretary and treasurer in the directorate of the Baltic. J. Henry Brooks and R. T. McKeever were elected directors, filling the vacancies created by the retirement of Joseph E. Gay and the death of the elder Mr. Stanton.

The headquarters of the Baltic Mining Company will be moved to Boston.

HOUGHTON COUNTY.

Atlantic—Interest is centered in the search for the northerly extension of the Baltic amygdaloid bed on section 16. A crosscut was driven west from the end of the drift which was extended 600 ft. into Atlantic ground from No. 5 shaft of the Baltic mine. The crosscut has penetrated 45 ft. without material change in the rock. As soon as it has been ascertained that the lode is not to the west of the drift a crosscut will be driven eastward.

Baltic—No. 2 shaft at the south end of the mine, will be in a position in a few months to furnish upward of 500 tons of rock daily.

Calumet & Hecla—It is nearly three years since the work of remodeling the stamp mills at Lake Linden was started. Out of the 22 heads in the two old mills 11 have been completed and 6 more are well advanced in their reconstruction. Therefore, 5 remain, upon which work will begin probably in April.

Isle Royale—Nothing very encouraging has been revealed in the shaft which is being sunk on the Baltic amygdaloid bed. A depth of 100 ft. has been reached and sinking probably will continue to 200 ft. before explorations on a lateral plane are attempted.

Tecumseh—Sinking in No. 1 shaft is down 375 ft. and is progressing at the rate of 100 ft. a month. Two levels have been established, one at 200 ft. from surface and the other 100 ft. below the first. Stations have been cut at both points and a start made toward opening drifts. The next level will be established at a depth of 400 ft. As a carefully selected stockpile is at the mouth of No. 1 shaft, containing 1000 tons, and the amount is continually increasing, it is possible that arrangements will be made for a stamp mill test in the spring. The Mineral Range

railroad affords connections with the Franklin mill at Grossepointe, where facilities can be secured for a mill test. No. 1 shaft is being opened with three compartments, two for skip-roads and one for a ladder way. Sinking will be continued to a depth of 1000 ft. at as rapid a rate as possible. No. 2 will be started soon.

Wolverine—No. 3 shaft and rock house was burned to the ground a few days ago, causing a loss of $11,000, covered by insurance. Production may be curtailed some, as Nos. 3 and 4 shafts were the only producers. Three shifts of men, working eight hours each, will be worked in the latter, greatly increasing the output of rock.

KEWEENAW COUNTY.

Cliff—Diamond drill work on this property, which is owned by the Tamarack Mining Company, has been under way for some time. A number of drill holes have been put down upon the bed which was explored to a slight extent by the Miskwabik and which is pronounced the Kearsarge amygdaloid. In four of these holes the lode was encountered, while in two holes the Wolverine sandstone was found in place.

ONTONAGON COUNTY.

Lake Copper Company—The old shaft on the Knowlton lode was pumped out recently. Repairs to the skip road have been completed and the timbering reinforced. This shaft is 375 ft. deep, or 25 ft. above the point where the fourth level will be established. Considerable copper is in evidence in the rock exposed in the shaft. A sand pipe was driven at an angle of 60 deg. from the horizontal to a depth of 200 ft., all through overburdened. As soon as the solid rock has been encountered drilling will start.

NEVADA.

ESMERALDA COUNTY.

Marietta, a prosperous mining camp in Esmeralda county a quarter of a century ago, but abandoned since 1880, is likely to come into prominence again, a Boston syndicate having secured an option on a majority of locations in the district. The late Dr. Webber owned a mine and mill in Marietta in the seventies and sank a fortune there on account of failure to recover the ore values by the milling process.

WHITE PINE COUNTY.

The Nevada Consolidated Copper Company has purchased all the holdings in the Ely district of the Chainman Mining and Electric Company. The property purpurchased consists of a group of five mining claims, 40 acres of land at the head of Murray creek, with water rights, and the electric power plant in Ely. The Chainman mine, which has heretofore been worked as a gold proposition, will be thoroughly prospected for copper. Development work on the property will be commenced as soon as conditions will permit.

The Cumberland-Ely Copper Company is contemplating the erection of a large concentrating and smelting plant in the immediate vicinity of Ely.

NEW HAMPSHIRE.

The Silver Lake mine at West Ossipee, New Hampshire, owned by H. E. Davidson, Atlantic avenue, Boston, Mass., is being worked for zinc ore. A mill comprising jigs and Wilfley tables has been erected.

PENNSYLVANIA.

ANTHRACITE COAL.

The annual report of the First Anthracite district, prepared by Inspector L. M. Evans, shows the following results: Fatal accidents, 53; non-fatal accidents, 61; Production by companies: Scranton Coal Company, 1,249,934; Delaware & Hudson, 1,141,048; Hillside Coal & Iron, 698,567; Delaware, Lackawanna & Western, 617,796; Temple Iron, 412,407; North End Coal, 10,531; Morse Hill Coal, 8,750. Total production, 4,284,033 tons. The production in the First anthracite district for 1904 was 4,466,335 tons, and 4,509,563 tons in 1903.

Mine Inspector Fenton, of the Eleventh District with headquarters at Mahanoy City, has given out a summary of his report for 1905, which shows that there are 14 collieries in his district, employing 11,000 men and boys. The total production for the year was 4,182,466 tons, an increase over the previous year of 369,489 tons. There were 50 fatalities and 58 non-fatal accidents. In 1904 the fatalities numbered 34, and there were 46 non-fatal accidents.

BITUMINOUS COAL.

The mine inspectors' report dealing with the bituminous coal mined in the Irwin district during 1905 has just been made public. The production by companies whose output was over 100,000 tons was as follows: Westmoreland Coal Company, 1,969,611; New York & Cleveland Gas Coal Company, 1,637,274; Keystone Coal Company, 1,103,416; Penn Gas Coal Company, 1,064,024; Pittsburg & Westmoreland Coal Company, 491,444; Manor Gas Coal Company, 452,847; Pittsburg & Baltimore Coal Company, 621,563; Ocean Coal Company, 472,561; United Coal Company, 224,056; Osceola Coal Company, 114,406. The two districts of which Irwin is a part produced more than 16,000,000 tons.

The reports of the entire 15 districts of western Pennsylvania are now complete, and they show the enormous output of more than 107,500,000 tons for 1905, divided as follows: First district, 8,092,788; Second, 8,669,747; Third, 4,007,297; Fourth, 5,294,644; Fifth, 8,582,753; Sixth, 8,635,382; Seventh, 6,597,875; Eighth, 4,483,162; Ninth, 8,483,562; Tenth, 5,314,972; Eleventh, 8,449,810; Twelfth, 6,443,810; Thirteenth, 8,791,547; Fourteenth, 7,600,003; Fifteenth, 6,133,941 tons.

SOUTH DAKOTA.

CUSTER COUNTY.

Extreme—It is planned to reorganize this company, which has been for some time in the hands of a receiver. The original incorporators have made a donation to the treasury of 50 per cent. of the original issue of stock, providing that the minority stockholders will subscribe 100,000 shares. A special meeting will be held soon for the election of new officers and a new board of directors. The property lies northwest of town and shows up a large vein of high-grade ore. The company has been hampered by lack of funds for development purposes.

Saginaw—Work will begin shortly on a cyanide plant which will have a capacity of 100 tons a day. This property is located eight miles northwest of town and has an immense quantity of very high-grade ore in sight. L. P. Woodbury is manager.

LAWRENCE COUNTY.

Homestake—Work on the power plant at Englewood is nearly completed and the line to the Father DeSmet, now the Mineral Point mill, and the Caledonia, now the Monroe mill, is now completed. Water is being conveyed from the Little Spearfish to Englewood by pipe-line for generating power. After it is used at the power plant this water will then be piped to the company's mills for further use. This Englewood plant is probably the first step toward supplying all the mills of this company with electric power.

Big 4—The work of unwatering the shaft of this property is now completed and a number of men will be put to work at once to sink the shaft to a farther depth. One 100-h.p. boiler is installed and the grading is about completed for a second boiler of 80 horse-power.

Hidden Fortune—Kirk G. Phillips, receiver of this company, has brought suit against Judge J. P. Allison, president of the company, for $90,000. It is claimed that Judge Allison has not made an accounting of stock, bonds and moneys of the company in his possession. Answer has not yet been made in the case by the defendant.

Eleventh Hour—The new 200-ton cyanide plant of this company has been formally opened. The opening was in the nature of a jollification and a large number of guests were present. The mill has eleven tanks and its own electric plant for furnishing power. Five thousand tons of ore are on the dump.

PENNINGTON COUNTY.

Alliance—A force of men has been put to work to open up this mine, which is financed by Alliance, Neb., parties. The

property comprises 480 acres and a 20-ft. vein of low-grade free milling ore is opened up. This will be developed by means of a tunnel which will cross-cut the vein about 140 ft. from the apex.

Mariposa—The work of patenting the ground of this company is under way and a force of men is engaged in running the tunnel, which has already been driven 115 ft., a distance of 300 ft. farther. It will intersect the orebody about 400 ft. from the surface. The vein is about 6 ft. in width and carries values running from $4 to $10. The company is capitalized at $1,000,000.

UTAH.

JUBA COUNTY.

Tintic Ore Shipments—Last week amounted to 184 car-loads, the shippers and amounts being: Ajax, 5; Bullion Beck, 13; Beck Tunnel, 9; Brooklyn Con., 3; Black Jack, 3; Carisa, 4; Centennial Eureka, 45; Dragon Iron, 10; Eureka Hill, 16; Eagle and Blue Bell, 8; Gemini, 30; Lower Mammoth, 2; May Day, 3; Ridge and Valley, 3; Swansea, 5; Uncle Sam, 4; Victor Consolidated, 1; Yankee Consolidated 6.

Bullion Beck & Champion—At the annual stockholders' meeting P. T. Farnsworth was elected president; Joseph F. Smith, vice-president, and M. C. Harris, of Salt Lake, secretary. The mine is operated principally by leasers.

TOOELE COUNTY.

Sacrament—This mine is producing from three to five flasks of quicksilver daily.

Herschel—Mining operations may be resumed at this property soon.

Galena King—This company has collected $100,000 from a late assessment, and will shortly undertake the vigorous development of its Stockton mines. The Honerine drain tunnel will be extended into the property and connected up with the orebodies.

SUMMIT COUNTY.

Park City Shipments—During the past week aggregated 4,240,000 lb., the shippers being: Silver King, 1,241,000; Daly West, 1,150,000; Kearns-Keith, 86,000; New York, 100,000; Daly Judge, 1,218,000; ditto, zinc middlings, 531,000.

UINTA COUNTY.

Raven Mining Company—Will inaugurate shipments of gilsonite about April 1.

Pariette Mines—Shipments of gilsonite have been made from this property continuously throughout the winter; employing a force of 35 men.

Utah Ozokerite—Preparations are being made to resume production at this property, near Colton.

WASHINGTON.

FERRY COUNTY.

Mountain Boy—A small shipment of ore brought returns of over $500 a ton from the smelter. Another shipment, being sacked, is said to average high in silver to the ton. The vein is small, and the ore has to be assorted. The lower grade of ore will be reserved for concentration at some future time. This mine is at Park City.

Quilp—Engineers have been engaged to get the machinery in order for immediate action and started Feb. 6. The company has secured a contract for the disposal of ore but nothing definite in that respect can be learned at present. Miners have been hired for working the mine at present on one shift, but it is believed here that the intention is soon to run it full-haned. Mining in this camp seems to be reviving, and all of the principal mines have been examined recently by a number of experts sent here for that purpose, but their movements have been guarded and cautious, and no information could be gained from any of them. Testing samples have lately been sent out in various directions, but for what especial purpose cannot be learned. There is evidently a move on to determine the best method of testing the ores of the camp by a milling proecss.

Pearl Consolidated—During last December 180 tons of ore, which averaged about $20 a ton, were shipped to the smelter, 33 tons of which assayed $26 a ton. The entire shipments came from the upper levels, which were supposed to have been stripped of payable ore. William M. Crummer, who has had charge of the San Poil, Black Tail, Quilp and Gold Hill Consolidated mines, successively, in this camp, is the present superintendent of the Pearl, and he believes there still remain large quantities of rich ore in the Lone Pine workings which can be made available by using care in stoping. The northeast drift on the 100-ft. level, below the lower tunnel level, is in 68 ft. in middle grade ore. The air compressor, boiler and Leyner drills, formerly used at the Princess Maud mine, have been purchased by the Pearl company and are being installed at the Lone Pine shaft.

Copper Key — The cross-cut on the 300-ft. adit level is being extended from the vein into the country formation for further exploitation. The vein, 40 ft. wide, has proven all ore, so far as it has been exploited, and is of good shipping value. Drifting on the vein will be continued.

Foreign Mining News.

CANADA.

BRITISH COLUMBIA.

Granby—This company is adding another converter stand to its plant, which will give it a converter capacity of about 3,000,000 lb. per month. At present the company is making a little over 2,000,000 lb. per month. The company is also preparing to remodel one of its smelting furnaces, with a view to increase the capacity from 300 tons per day to 450 tons. The smelting works are now treating about 80,000 tons of ore per month. A new 3-compartment shaft is being sunk at the mine. upon which will be installed a 250-h.p. electrically driven double-drum hoist. A new 75-h.p. electric locomotive is being installed at the mines in connection with the haulage system.

Boundary—The Dominion Copper Company has placed an order for the Traylor Engineering Company of New York for a large copper matting furnace which will measure 48x204 in., inside the jackets at the tuyere line. The water jackets will be of steel, flanged and riveted, with no seams or rivets exposed to the fire. They will be arranged in two tiers, oneabove theother. The furnace will be entirely self-contained, and will have a capacity of 350 to 400 tons a day.

NOVA SCOTIA.

Dominion Coal Company—The coal mined in January was 231,606 tons, an increase of 70,988 tons over January, 1905. Shipments for the month this year were 188,349 tons.

ONTARIO.

The shipments of ore from the Cobalt mining camp for 1905 aggregated 2144 tons from 17 shipping mines. The metal contents were as follows: Silver(2,441,421 oz., valued at $1,355,306; cobalt, 118 tons, valued at $100,000; nickel, 75 tons, valued at $10,525; and arsenic, 549 tons, valued at $2693—being an aggregate value of $1,448,524 received by shippers. These figures, so far as relates to the three latter items, were considerably reduced by the refusal of buyers during the latter part of the year to make any allowance for the nickel, cobalt or arsenic contents of the ore on account of its refractory character.

AUSTRALIA.

WESTERN AUSTRALIA.

The gold production for February is reported at 142,427 oz. fine. For the two months ending Feb. 28, the total was 296,792 oz. fine gold, a decrease of 22,693 oz., as compared with the corresponding period last year.

FRANCE.

PAS-DE-CALAIS.

One of the most disastrous colliery explosions that has happened in France occurred in the Courrières colliery in the Pas-de-Calais district on March 10.

The last previous great mine disaster in France occurred in 1885, when 293 persons were killed and 80 injured; but that and all others sink into insignificance before Courrieres.

At the time of the disaster it is believed that there were 1200 miners in the workings, and it is believed that the loss of life is heavy. Already 200 bodies have been recovered.

The scene of the catastrophe is the mountainous mining region near Lens, in the department of Pas-de-Calais. Here are huddled small hamlets of the mine workers who operate the most productive coal mines in France. The mines are worked by tunnels. Six of the tunnels are near Lens, and others are at Courriéres, Verdun, and many other points. The output of the mines is largely used in the manufacture of gas and in smelting. About 2000 miners work the group of mines and, with their families, make a population of from 6000 to 8000.

The coal mines in the district are under stringent Government supervision, and consequently accidents have been reduced in a remarkable degree. The present catastrophe will be thoroughly investigated by the Government officials.

SPAIN.

HUELVA.

Recently a group of Spanish mines within Huelva district was floated in London under the name of the Esperanza Copper and Sulphur Company. The chief workings are the Esperanza and the Angostura; but at other points along the outcrop some promising exploring work has been done.

Coal Trade Review.

NEW YORK, March 14.

ANTHRACITE.

The labor negotiations remain the objects of prime interest in the hard-coal market. The demands of the miners have been refused by the committee of operators. The demands, and the reasons for their refusal, will be found in another column. The rumor that certain bituminous operators will try to compel a strike in the anthracite fields seems to be gaining strength, but the discordant attitude of the bituminous fields as a whole in regard to the miners' demands, will vitiate any concerted plan toward this end. Following the undiminished mining activity of the past winter in the face of exceptionally unfavorable coal-burning weather, many anthracite producers, if they do not have a suspension thrust upon them, will be obliged to curtail output for a season, and it is partly this fact, probably, that has inspired their unyielding policy.

Local consumers are stocking to the utmost and are creating a demand for certain sizes of coal. Prices, however, hold at $4.75 for broken and $5 for domestic sizes. Steam sizes: $3 for pea; $2.25@2.50 for buckwheat; $1.45@1.50 for rice and $1.30@1.35 for barley f.o.b. New York harbor shipping points.

BITUMINOUS.

The Atlantic seaboard soft-coal trade shows heavy shipments which are being absorbed with rapidity. Most consumers are keeping their stocks up to the capacity of their storage room on account of the strike talk. Transportation and car supply are excellent on the Pennsylvania, but are poor on other roads.

A fair number of contracts have been closed, but the possibility of a strike is making the producers not over-anxious to close out all their tonnage. Some of the more speculative firms have offered coal on contracts which do not include the strike clause; but these would probably be the very ones to show failure in their agreements if a strike occurred.

Consumers in the far East seem to be taking in coal as fast as possible, and are glad to have their coal shipped promptly. Coastwise freights to this district remain high, to the annoyance of consumers, but the vessel owners are merely taking advantage of a naturally strong demand for their services. Trade along the Sound is fairly strong and is absorbing all the coal that can be supplied. New York harbor is easy on account of the heavy arrivals from the big shippers. Prices range around $2.60 f.o.b. New York harbor shipping points. All-rail trade is strong and steady.

The coastwise-vessel market shows a good supply of boats which are chartered quickly at the prevailing high rates. The present quotations from Norfolk, Newport News, Baltimore and Philadelphia to Boston, Salem and Portland is $1, and discharge. New York charges 60@70c. to around the Cape.

COAL TRAFFIC NOTES.

The total coal and coke traffic originating on all lines of the Pennsylvania railroad east of Pittsburg and Erie for the year to March 3, was as follows, in short tons:

	1905.	1906.	Changes.
Anthracite	675,900	879,205	I. 203,305
Bituminous	4,457,297	6,355,355	I. 1,898,058
Coke	1,716,094	2,159,240	I. 443,146
Total	6,849,291	9,393,800	I. 2,544,509

The increase continues steadily large.

Shipments of Broad Top coal for the week ending March 10 were 22,059 tons; for the year to March 10 they were 211,155 tons.

Birmingham. March 12.

There is no hesitation in the Alabama coal fields and every ton of coal that can be mined is finding a ready sale. The railroads are unable to transport the coal as promptly as the producers would like to see.

The report of the State mine inspector as to the coke production in Alabama for the year 1905 has been issued. It shows that the State produced 2,756,698 tons of coke against 2,284,095 tons in 1904. There are 9982 coke ovens in the State, with 647 of them not producing during the year. Jefferson county made out of this total amount 2,334,618 tons of coke.

The report of the State mine inspector in regard to the "windy shot" and explosion in the Piper mines the first part of this month, which caused the death of 11 men and the injury of seven others, has been filed with the Governor.

Chicago. March 12.

The coal-trade market in the last week has been dull though indications of today's trade are that there will be something approaching briskness this week. Consumers of steam coal are not yet stocking largely in bituminous, against the threatened strike, and anthracite is hopelessly dull. Prices of Illinois and Indiana coal are a little higher, but the supply continues large for the demand, except on a few grades that are troubled with lack of cars at the mines. The sales of eastern coal are even, no important general change having yet occurred, though retailers and consumers are watching the market closely if inquiries are satisfactory evidence.

The cold weather of the last two days resulted today in an increase in orders for domestic sizes of bituminous and for anthracite. Consumers are running so closely up to their immediate needs that there will be no increase of anthracite sales before next month, except under unusually cold weather.

Cleveland. March 13.

The coal trade in this territory has shown a tendency toward higher prices, due to the desire on the part of consumers to lay in stocks in anticipation of a strike. A yielding of the bituminous operators to the demands of the miners is now considered a possibility, but it seems evident that a hard-coal strike is unavoidable. Either contingency would cause a shortage of coal in this territory and the result is that stocks have been increased. The prices have advanced to $1.25 at the mines for mine-run steam coal, which is an advance of 15c. a ton over the price a week ago, and brought about by premiums paid by those wanting to store coal. The car supply has been sufficient but the demand has been unusually large. The prices on slack are showing an advance also and this week both Ohio and Pennsylvania slack is selling at $1 at the mines.

The coke market is again reported strong, but the prices have held about as they were a short time ago. The best grade of 72-hour foundry coke is quoted at $3@3.25 at the oven, with furnace coke selling at $3.25. at the oven

The Lake rates on coal have not been changed, but more boats have been chartered to move the first cargoes up the Lakes. The shippers, expecting an early opening of navigation, have begun demands on the railroads for cars for the Lake trade, which has been heard in some instances and the equipment supplied. The rates for the opening of the season are 35c. to Lake Michigan and 25c. to Lake Superior. The open weather has caused a small consumption of domestic coal, and were it not for the possibility of a strike that market would be weak.

Pittsburg. March 13.

Coal—The sentiment of the coal interests, outside of the Pittsburg Coal Company, in this district, is against an advance. This was developed at a meeting held here on Friday. About 50 operators were present and were in session for two hours. An expression of opinion was obtained from each and according to a report at the close of the meeting, all declared in favor of a continuation of the present scale except two independent concerns and the Pittsburg Coal Company. The two independents favored a compromise on a basis of the scale of 1903, provided a three-year agreement is signed. The Pittsburg Coal Company favored a compromise rate under certain conditions which were not made public. A resolution was passed to attend the general meeting of operators of the four leading bituminous coal mining States, Pennsylvania, Ohio, Indiana and Illinois, at Indianapolis on Monday, March 19, but no official action was taken on the mining rate. All will go uninstructed. Unless something happens that is not expected now, there seems to be no doubt but that the Interstate agreement will be dissolved and a strike occur in the four States parties to the agreement. A strike involving about 300 miners was begun in the non-union Irwin field about a week ago and efforts are being made to extend it throughout the region and into the coke fields. Leaders of the miners say there is every indication that the non-union men in this section will take the initiative in the general strike movement. If the United Mine Workers succeed in making a settlement the non-union men propose to continue their strike until they are granted union rates and conditions. The mines in the Pittsburg district are being operated more fully than usual but the probability of a strike has not had much effect on prices. Mine-run coal is firm at $1@1.10 a ton at the mine.

Connellsville Coke—Both production and shipments fell off somewhat last week, but prices remain about the same Furnace coke is quoted at $2.35@2.50 and foundry at $2.90@3 a ton. The production for the week amounted to 280,503 tons and the shipments to 11,881 cars distributed as follows: To Pittsburg and river points, 4303 cars; to points west of Pittsburg, 6346 cars; to points east of Everson, 1232 cars. This was a decrease of 349 cars in shipment and 1224 tons in production. The combined shipments from the Connellsville and Masontown fields amounted to 14,371 cars or 346,298 tons.

San Francisco. March 8.

There is no change to be reported in the market. Arrangements are being made to export oil, which may affect the domestic market.

For coast coals, in large lots to dealers, prices are as follows: Wellington, New Wellington and Richmond, $8; Roslyn, $7; Seattle and Bryant, $6.50; Beaver Hill and Coos Bay, $5.50; White Ash, $5.52. For Rocky Mountain coals in car lots quotations are: Colorado anthracite, $14; Castle Gate, Clear Creek, Rock Springs and Sunny Side, $8.50. Eastern coals are nominal at $14 for Pennsylvania anthracite and $13 for Cumberland. For foreign coal quotations are, ex-ship: Welsh anthracite, $13; cannel, $8.50; Wallsend and Brymbo, $7.50 per ton.

Foreign Coal Trade.

March 14.

The total coal production of France in 1904 and 1905 is given in the following official figures, in metric tons:

	1904.	1905.
Nord and Pas-de-Calais	21,718,269	23,166,981
Loire	3,598,591	3,744,228
Bourgogne and Nivernais	1,975,322	1,970,827
Gard	1,833,247	1,946,272
Tarn and Aveyron	1,783,383	1,842,255
Bourbonnais	998,278	1,041,571
All other districts	1,595,304	1,635,096
Lignite	665,572	701,034
Total	34,167,966	36,048,264

This shows an increase of 1,880,298 tons, or 5.5 per cent., in the total output, most of which was contributed by the Nord and the Pas-de-Calais.

Iron Trade Review.

New York, March 14.

But little change can be reported in the iron and steel markets this week. On the one hand, a certain hesitation is manifest, which finds its expression chiefly in light buying of the primary material, pig iron. At present this seems temporary in character, and it is possible that it will soon pass over.

On the other hand, there continues to be a strong demand for construction material of all kinds, for rails and for railroad equipment. This seems to be based on actual requirements, not on any speculative movement; that is, there is work in progress and plans actually financed, which will consume enormous amounts of such material.

For the actual work in hand there is no question. Mills generally are full of work, and in many cases so pressed that they are behind on their contract deliveries, notwithstanding the favorable conditions which have prevailed through the winter.

The uncertain point in the immediate future is found in coal-mining conditions. A strike of the miners, should it last for any considerable time, will do much toward demoralizing the trade. Where it is possible, the large steel mills are putting in stock sufficient to carry them over a short suspension of mining; but there are many cases where this cannot be done.

Birmingham. March 12.

While the pig-iron market is not as active as it has been at times this year it is steady and some of the larger manufacturers in this district assert that their sales are equal to the production. No. 2 foundry is still being quoted at $14.50 per ton. A few sales with long delivery have recently been made at $14. The production is good. The Tennessee Coal, Iron and Railroad Company is getting a steady output at Alice furnace, which was started up a few weeks ago. The Sloss-Sheffield Steel and Iron Company will blow in No. 2 furnace in the city in the next few weeks, some delay in the repairing having been encountered. The Woodward Iron Company, Lacey-Buek Company, Tutweiler, Alabama Consolidated Coal and Iron Company, Central and Republic Iron and Steel Company have all been getting out a good quantity of iron right along.

The following quotations for iron are made: No. 1 foundry $14.50@15; No. 2 foundry, $14@14.50; No. 3 foundry, $13.50 @14; No. 4 foundry, $13@13.50; gray forge, $12.50; No. 1 soft, $14.50@15; No. 2 soft, $14@14.50 per ton.

Chicago. March 12.

The iron market seems to be on the up grade again. Sales are becoming brisk, though there is no advance in prices, and most of the buying is in small lots to cover immediate requirements. The reluctance of melters to contract for Southern under the new freight rate, however, has worn away, and this is possibly due to lower prices on Southern. Quotations nominally continue $14@14.50 Birmingham for No. 2, making the Chicago price $17.90@18.40, but rumors say that Southern has been cut 25c. on some sales, to meet the advance in freight rate. With Northern No. 2, at $19@19.50 there would seem no reason for such a reduction, the market so far as price is concerned being decidedly in favor of Southern. There is a good sale for Northern in the small-lot business, and agents, both Northern and Southern, are enlarging their contract business. Business in iron and steel products continues good, and there are no signs of relapse in the pig-iron market.

Cleveland. March 13.

Iron Ore—The movement from the Lake docks to furnaces continues heavy. About all the ore on dock has been sold. Efforts are being made to make wild charters of boats for the opening of the season of navigation, expected about April 1. This is likely to be at a reduction from contract rates, the talk being of a 70c. rate from the head of the lakes. No new buying for 1906 delivery is reported, due to the uncertainty of the pig-iron situation after July 1.

Pig Iron—Most consumers are confining their purchases to needs for spot delivery. The absence of contracting is increasing the anxiety of furnaces, and reductions in price have been made. The market is holding here now on a basis of $17 for No. 2 in the Valleys, which prices are being shaded in some instances by furnaces having an advantage over the Valleys in the matter of freight rates. The bessemer and basic situations are easier.

Finished Material—Some of the weakness has disappeared from the market by the confession of the mills that they are unable to carry out their promises for prompt delivery. Some orders for structural have gone to protest during the past week and consumers have been forced to rely on jobbers for quick shipment. Plates are easy, being obtainable in three to four weeks. Billets are hardly to be had at all, even some of the smaller mills withdrawing from the market. Forging quality is offered in Cleveland at $35 delivered. Small round bars are easy, but a big order could not be delivered inside of five to seven weeks. Sheets are stronger, with deliveries promised on mill orders in eight weeks. Some new ships are coming up, but the material has already been covered on contract.

New York. March 14.

Pig Iron—Business has been more active and there is a better inquiry. The uncertainty about coal affects the market.

For Northern iron, large lots, we quote: No. 1 X foundry, $18.25@18.75; No. 2 X, $17.75@18.25. No. 2 plain, $17.25 @17.75; forge, $16.75@17.25. For Southern iron on dock prices are: No. 1 foundry,, $18.25@18.50; No. 2, $17.75@18; No. 3, $17.25@17.50; No. 4, $16.25@17; No. 1 soft, $18.25@18.50; No. 2 soft, $17.75@18; gray forge, $16.25@16.50. Basic is still held at $19 for Virginia, $18.75 for Alabama and $18.25 for Northern.

Cast-Iron Pipe—Prices are steady, the present basis being $29.75 per net ton for 6-in. pipe in carload lots at tidewater points. The foundries are all busy.

Bars—Business is slow, and prices are off. Sales have been made at 1.745@ 1.795c. for common iron bars, and 1.845c. for refined iron. Steel bars are steadier, and hold at 1.745c. tidewater. Store trade is quiet at 2@2.25c. delivered.

Plates—Steel plates are in fair demand. Tank plates are nominally 1.745@1.825c.; flange and boiler, 1.845@1.945c.; universal and sheared plates, 1.745@1.845c.; according to width.

Structural Material—Prices are nominally unchanged. Beams under 15 in. are 1.845c. for large lots; over 15 in., 1.895c.; angle and channels, 1.845c., tidewater delivery. Jobbers ask a considerable advance on small orders. New building projects are noted locally, involving a large quantity of material.

Steel Rails—No change in standard sections. Light rails are in steady demand, prices ranging from $26 for 35 lb., up to $33 for 12-lb rails. Orders for trolley rails are still in evidence.

Old Material—Business is a little better. No. 1 yard wrought can be had for $17@18; machinery cast, $14@14.50; heavy steel melting scrap, $15.50@16.50. These prices are on cars, Jersey City or other terminal delivery.

Philadelphia. March 14.

Pig Iron—The present influences surrounding the pig-iron market point to the probability of an early and active demand for near and late deliveries. There are quite a number of small consumers who have been content to buy in a hand-to-mouth way for reasons not apparent, and many of these are now inquiring for considerable iron for delivery within 90 days. Makers of iron are now firmer in their views as regards prices. The possibilities of a strike have not yet been fully discounted and our pig-iron people hesitate to express any decided views for print. Eastern basic has sold here at $17.75 for early delivery and at $17.50 for delivery during the second quarter. Foundry iron has remained inactive, though there are a few inquiries. Forge iron is strong, but there have not been any recent purchases of moment. Quotations are substantially $19 for No. 1 X foundry; $18.50@18.75 for No. 2 X; $17.50 for No. 2 plain, standard forge $17.

Steel Billets—The billet market would be quite active just now if the mills were able to meet the terms of the requirements of buyers with reference to delivery. Quotations remain pretty close to $29.50.

Bars—In the absence of any real live news there is a rumor that some transactions are pending for considerable common iron for car building at something below the standard prices.

Pipes and Tubes—The consumers of pipes in this territory are large buyers and have some sort of an arrangement by which all they have to do is to order what they want, at understood prices.

Merchant Steel—This week's news is to the effect that a good deal of ordering has been done to cover some forward requirements.

Structural Material—The only report today is that the mills have now the "yes" or "no" on a big lot of business calling for specific deliveries during the summer as to dates. The structural-iron requirements are likely to give our iron people a good deal of trouble, as all of our mills are now under cast-iron arrangements which they cannot twist out of. The outlook is for a much heavier demand than has ever been experienced for fabricated material. Commercial requirements for office buildings and general construction are now looming up on every side.

Steel Rails—Our steel-rail people say that the next rush of activity will be in girder rails and in material for electric-line construction. The agents of the light rail makers also report quite an active inquiry for light rails for mine and other requirements, and the outlook is for a great deal of business in this direction.

Scrap—The scrap situation is not quite so satisfactory so far as the demand is concerned. Our scrap people have been scouring the country up and down and have gotten control of a good deal of material of one kind or another, and it now remains to be seen whether they can sell it at the profit which they figured on. There is no quotable change in selling prices.

Pittsburg. March 13.

The pig-iron market is decidedly dull, sales of bessemer during the week being confined to a few small lots. It is estimated that the United States Steel Corporation in exercising its option last week on all the available first-quarter bessemer iron of the Bessemer Pig Iron Association will get fully 10,000 tons, which will be delivered this month at $17.25, Valley. This is a small amount compared with the total make of the Steel Corporation furnaces, which are now producing nearly 1,000,000 tons a month. All the furnaces are in operation, except one of the Isabella stacks which is being rebuilt. It is reported that the average daily production of the Corporation furnaces in February was a trifle over 33,000 tons. Sales of foundry and gray forge have been so light that it would be difficult to give an accurate quotation. The Cambria Steel Company bought 3000 tons basic about a week ago, but not from Valley furnaces, and the price paid was not made public. Southern iron is well held although none has been bought for this market for some time. No. 2 foundry is quoted here at $14, Birmingham, with $4.60 a ton freight added for delivery in the Pittsburg district. Gray forge is held at $12.50, Birmingham, equal to the last quotation for Northern forge. It is believed, however, that this price could be shaded about 25c. a ton if a desirable order was offered. It is reported that President W. E. Corey of the United States Steel Corporation will come here on Friday to meet the presidents of the subsidiary companies. These meetings of presidents are merely for the purpose of hearing reports on conditions and requirements of the different interests. If it is found that more outside pig iron is needed for second quarter, negotiations will be opened at once. The Corporation has a contract for bessemer iron for second quarter at $17.75, Valley, guaranteed against a decline. If it succeeds in buying iron at $17.50, which now seems probable, the price on the existing contract will be reduced to that figure. It has developed

that the price of ferro-manganese is not only being kept up by scarcity but on account of the unusually heavy consumption. Reports show that imports have not fallen off to any great extent and it is doubtful if the promised lower prices after July 1 will be realized. It is announced that the Carnegie Steel Company, that was a seller until ferro became scarce, will not enter the market as a seller this year.

The steel mills are active but no new business of any consequence is being booked. Specifications are heavy against old contracts and it will be some time before the mills will be able to catch up on the orders. The Cambria Steel Company has taken an order for the structural material for the new court house at Chicago, and the American Bridge Company will fill an order for 14,000 tons of fabricated material for the Japanese Government. Some new orders for plates and steel bars have been received and it is not likely that prices will be advanced, at least not before the fourth quarter. The bar iron market has been weak and prices have dropped to 1.70c., Youngstown, or 1.74¾c. Pittsburg. The sheet and tin-plate business is unusually good, but prices remain unchanged. The mills in this district are preparing for a great coal strike by storing coal. The Carnegie Steel Company will be in better shape than any of the others with the exception of the Jones & Laughlin Steel Company. These concerns will have a supply for fully 60 days. A large number of empty coal boats, barges and flats were brought up from down river ports on a rise in the rivers last week and these are being loaded. There is no difficulty in storing a supply of coal at mills along the river. The Jones & Laughlin Company, in addition to its river source of supply, is piling coal received by rail on vacant property adjoining its mills. If a strike does occur it is believed it will not continue more than 30 days.

Pig Iron—Sales of bessemer pig iron during the week amount to nearly 1000 tons at $17.50, Valley, which appears to be the maximum price. Basic is quoted at $17, and foundry No. 2 at $17.25, Valley and gray forge at $17.10, Pittsburg. These prices could be shaded on a good order.

Steel—Deliveries of billets and sheet-bars have improved, but prices are unchanged, bessemer billets being quoted at $27 and open-hearth at $28. Sheet bars are nominally $27. The Ohio works of the Carnegie Steel Company will go on rails on Monday, and two weeks later will return to sheet-bars for a couple of weeks when the plant will be put on rails for the rest of the year. Plates remain firm at 1.60c. and merchant steel bars at 1.50c.

Sheets—The market is strong, specifications being unusually heavy. Some mills are filled up for two or three months ahead. There is no change in prices, black sheets being quoted at 2.40c. and galvanized at 3.45c. for No. 28 gage.

Ferro Manganese—The demand continues heavy and prices are high, ranging from $135 to $150 a ton.

BY TELEGRAPH.

PITTSBURG, March 14.—The Bessemer Furnace Association has sold to the Steel Corporation 5000 tons basic pig at $17, Valley, equivalent to $17.85 Pittsburg. The association now has only 35,000 tons bessemer and 15,000 tons basic unsold for second quarter.

The bar-iron settlement made today at Youngstown disclosed an average of 1.6c. per pound during January and February, against 1.5c. previous settlement; thus advancing puddlers' wages from $5.75 to $6 per ton.

Cartagena, Spain. Feb. 24.

Iron and Manganiferous Ores—Messrs. Barrington and Holt report that shipments for the week were four cargoes, 4950 tons, to Great Britain, and five cargoes, 15,050 tons, to Rotterdam. The fall in exchange has tended to harden the prices of iron ore, and quotations are all about 3d. per ton higher for prompt business and contracts over the next few months. The new pumping installation in this sierra, to which we have referred in a previous report, continues to work satisfactorily, and the pumps are now lifting from a depth of 194 meters a daily volume of 7135 cubic meters of water.

Quotations are 8s. 3d.@8s. 7d., for ordinary 50 per cent. ore; 8s. 10d.@9s. 2d. for special low phosphorus; 11s. 7d. for specular ore, 58 per cent.; 10s. for S. P. Campanil. All prices are f.o.b. shipping port. Manganiferous ores, same terms, range from 11s. 5d. for 35 per cent. iron and 12 manganese, up to 18s. for 20 iron and 20 per cent. manganese.

Pyrites—Iron pyrites, 40 per cent. iron and 43 sulphur, are quoted 10s. 6d. per ton, f.o.b. Cartagena.

Heavy Chemicals and Minerals.

NEW YORK, March 14.

Heavy chemicals show some change, with evidence of decided strength in several lines. The quotations are shown in the table given herewith; and in particular:

Nitrate of Soda—Conditions on the west coast (of South America) are still unsettled. Not only are the producers still in disagreement as regards the limit for production, but labor troubles are temporarily interfering with the handling of the nitrate. Consumption is also increasing. In view of all this the market is much stiffer, and quotations tend to hold firmly, or even to advance as shown herewith. Other, and perhaps exceptional sales are, however, quoted at lower figures. The production for 1905 was 1,733,000 tons, of which Europe absorbed 1630 tons, and the United States, 353,000 tons.

It is worthy of notice that in all the enormous output of nitrate of soda in northern Chile there is no American capital interested, although shipments to the United States are increasing. The companies are mostly English, with a few Chilean and German.

As an example of the profits in the production of nitrates, the annual report of the London Nitrate Company, Ltd., on October 31, 1905, showed that the company was organized in 1887 with a capital of $800,000. In eighteen years the company had paid in dividends $1,170,000 and had returned to its stockholders $400,000 of its original capital, making a total of $1,570,000 cash. Besides this the company had established new plants at a cost of $400,000 and had begun a sinking fund invested in English securities of $100,000 more. This shows that the total cash earnings of the company in eighteen years had reached the enormous sum of $2,100,000. It still has on hand a capital stock of $400,000 and assets worth, at low valuation, $355,000.

PRICES.

Alkalies.	
Soda ash, per lb	0.80@.87½c.
Bicarb soda, per lb	1.3@1.5c.
Bleaching powder, per lb	1¼@1.3c.
Soda, caustic, per lb	1¾@2½c.
Salt cake, per lb	.65c
Sal soda, per lb	.6@1.4c.
Soda, monohydrate, per lb	1¼@1⅜c.
Potash, caustic, per lb	4½@6¼c.
" carbonate, 82-85%	3¾@4¼
Alum, per lb	1.75@1.90c.
Ammonia, aqua, 26 deg., per lb	5@5¾c.
Acids.	
Carbonic, liquid gas	" .12½
Hydrochloric, nominal, per lb	1.1c.
Hydrofluoric, 30%	per lb. .03
48%	" .05
60%	" .11
Nitric acid, 100 lb	$4@$4.50
Oxalic acid, com'l, 100 lb	$5.00@5.50
Sulphuric acid, 50°, bulb, for	13.50@14.50
60°, 100 lb. in carboys	1.00
60°, bulk, ton.,	18.00@20.00
66°, 100 lb. in carboys	1.00@1.25
66°, bulk, ton	21.00@23.02
Arsenic, white, per lb	6@8c.
Blue Stone (copper sulphate), carload	$5.85
100 lb	6.50
Nitrate of soda, 100 lb. 96% to July	$2 27½@2.30
95% to July	2.25@2.27
96% July to Dec.	2.25@2.27
95% " " "	2.22½
	spot, $2.25
Saltpeter, per lb	4½@5½c.
Potash, muriate, per cwt.	$1.90@$1.98
Potash, kainite, per long ton	8.50@9.50
Potash, sulphate, 90%, 100 lb	$2.18@2.21½
Sulphate of ammonia, per 100 lb	3.10@3.12½
Sulphur.	
Louisiana (prime) to New York, Boston or Portland, ton	$22.12½
To Philadelphia or Baltimore "	22.62½
Tin, bichloride per lb	.10½
Crystals, per lb	.22½
Pyrite.	
Domestic, furnace size, Unit	10½@11c.
Fines "	8@8½c.
Imported, lump, At. ports "	11@12c.
" fines " " "	10@10½c.
" furnace size "	11@12c.

Pyrite prices are per unit of sulphur. On lump deliveries, a charge of 25c. per ton is made for breaking to furnace size.

Phosphates.	F. O. B.	
*Fla., hard rock	$8.00@8.50	
land pebble	4.50@5.00	
†Tenn., 78@80%	4.60@4.65	
78%	4.00@4.25	
75%	3.75@4.00	
68@72%	3.25@3.50	
‡So. Car. land rock	4.00@4.25	
river rock	3.75@4.00	

*F. o. b. Florida or Georgia ports. †F. o. b. Mt Pleasant. ‡On vessel Ashley River, S. C.

The nitrate industry in Chile is of the greatest importance, because the Government receives something like $25,000,000 in gold annually from an export duty on the nitrates.

Phosphate—The market is much stiffer on account of an apparent shortage for 1906; in accord with which quotations have advanced significantly, as shown in the table following.

Potash Salts—These products still continue interesting. The issue seems to be a lack of agreement between the main producers and certain independents in Germany. As is well known, the Kingdom of Prussia is the principal stockholder and promoter of the Kali syndicate. The matter is further complicated by the recently proposed bill for an export duty on potassium salts. The situation is uncertain, but a rise in the prices of the various potassium salts is not improbable.

Selenium—This recently appeared on the market in a quiet way, at $3 per lb. of about 98½ per cent. grade.

Uranium Ore—This material can now be obtained from the Joachimsthal mines in Bohemia, owned by the Austrian Government. Quotations for small lots, by post, are $3.32 per lb.; in larger lots, 50 per cent. ore sells at $2.22; and 60 per cent. ore at $2.66 per lb. The residue of pitchblende is not for sale.

Metal Market.

New York, March 14.

Gold and Silver Exports and Imports.

At all United States Ports in January.

Metal.	Exports.	Imports.	Excess.
Gold:			
Jan., 1906..	$ 5,741,665	$2,600,971	Exp. $ 3,140,694
Jan., 1905..	16,828,168	1,895,691	Exp. 14,932,477
Silver:			
Jan., 1906..	7,516,668	4,692,096	Exp. 2,824,572
Jan., 1905..	4,364,745	1,924,202	Exp. 2,442,543

These statements cover the total movement of gold and silver to and from the United States. The figures are furnished by the Bureau of Statistics of the Department of Commerce and Labor.

Gold and Silver Exports and Imports, N.Y.

For the week ending March 3, and for years from January 1.

Period.	Gold.		Silver.	
	Exports.	Imports.	Exports.	Imports.
Week....	$ 4,000	$ 31,653	$1,026,552	$ 19,980
1906.....	3,027,379	459,157	15,685,231	367,331
1905...	29,457,196	831,827	7,474,154	398,877
1904.....	1,360,660	1,455,275	10,672,378	170,143

Exports of silver for the week were chiefly to London. Imports were from the West Indies and South America.

The statement that gold to the amount of $1,500,000 has been taken in London for shipment to New York indicates the beginning of a movement rather unusual at this season of the year.

The statement of the New York banks—including all the banks represented in the clearing house—for the week ending March 10, gives the following totals, comparison being made with the corresponding week of 1905:

	1905.	1906.
Loans and discounts..	$1,132,920,300	$1,019,579,580
Deposits.....	1,187,665,800	1,001,932,000
Circulation.....	42,864,500	51,438,700
Specie.....	221,187,700	178,668,000
Legal tenders.....	85,004,900	78,278,700
Total Reserve.....	$306,194,600	$256,946,700
Legal requirements....	296,916,450	250,483,000
Surplus reserve.....	$9,278,150	$6,463,700

Changes for the week this year were increases of $531,700 in circulation and $1,454,900 in surplus reserve; decreases of $21,259,200 in loans, $4,004,800 in specie, $1,443,500 in legal tenders and $27,613,000 in deposits.

The following table shows the specie holdings of the leading banks of the world. The amounts are reduced to dollars:

	Gold.	Silver.	Total.
New York.....	.....	.....	$178,668,000
England.....	$138,321,095	.....	138,321,095
France.....	578,434,775	$210,547,820	788,982,595
Germany	181,360,000	60,450,000	241,810,000
Spain.....	75,345,000	117,415,000	192,760,000
Netherlands....	31,889,000	30,403,000	62,292,000
Belgium.....	16,743,335	8,376,665	25,120,000
Italy.....	141,085,000	18,891,000	159,976,000
Russia.....	469,050,000	20,020,000	489,070,000
Austria.	229,165,000	63,480,000	292,645,000

The returns of the associated banks of New York are of date March 10 and the others March 9. The foreign bank statements are from the *Commercial and Financial Chronicle*, of New York. The New York banks do not separate gold and silver in their reports.

Shipments of silver from London to the East are reported by Messrs. Pixley & Abell as follows, for the year to March 1:

	1905.	1906.	Changes.
India.....	£ 1,406,387	£ 3,794,910	I. £ 2,388,523
China.....	1,370	.....	D. 1,370
Straits..	2,800	.....	D. 2,800
Total.....	£ 1,410,557	£ 3,794,910	I. £ 2,384,353

Imports for the week were £8000 from Australia, £249,000 bars and £60,000 in Mexican dollars from New York; £317,000 in all. Exports were £390,400 in bar silver and £171,100 in Mexican dollars; £561,500, all to India.

Indian exchange has been easier, the Council bills offered in London having been taken at an average of 16.04d. per rupee. Buying of silver for India has fallen off somewhat.

The silver market, after declining to 29d. on March 10, began to improve, and has gradually advanced to 29⅝d. in London. It is reported that purchases for Siam were the occasion of the advance.

SILVER AND STERLING EXCHANGE.

Mar.	Sterling Exchange.	Silver. New York, Cents.	Silver. London, Pence.	Mar.	Sterling Exchange.	Silver. New York, Cents.	Silver. London, Pence.
8	4.85¼	64¼	29 11/16	12	4.85¼	62⅞	29 1/16
9	4.85¼	63⅞	29 5/16	13	4.85¼	63¼	29 3/16
10	4.85¼	62⅝	29	14	4.85¼	63⅜	29⅛

New York quotations are for fine silver, per ounce Troy. London prices are for sterling silver, .925 fine.

Prices of Foreign Coins.

	Bid.	Asked.
Mexican dollars.....	$0.49⅛	$0.51⅛
Peruvian soles and Chilean.....	0.45¾	0.47½
Victoria sovereigns.....	4.85⅛	4.87⅛
Twenty francs.	3.87	3.89
Spanish 25 pesetas..... ...	4.78	4 80

Other Metals.

Daily Prices of Metals in New York.

March.	Copper. Lake, Cts. per lb.	Copper. Electrolytic, Cts. per lb.	Copper. London, £ per ton.	Tin. Cts. per lb.	Lead. Cts. per lb.	Spelter. New York, Cts. per lb.	Spelter. St. Louis, Cts. per lb.
—	18⅛	18⅛				6.25	6.10
8	@18⅜	@18⅛	79⅞	36⅛	5.35	@6.35	@6.20
9	18⅛	18¼				6.25	6.10
	@18¾	@18⅜	79¾	36¾	5.35	@6.35	@6.20
10	18⅛	18⅛				6.25	6.10
	@18¾	@18⅛	.....	36¼	5.35	@6.35	@6.20
12	18⅛	18¼				6.25	6.10
	@18¾	@18⅜	79 15/16	36⅜	5.35	@6.30	@6.15
13	18⅛	18⅛				6.25	6.10
	@18¾	@18⅛	79 13/16	36⅛	5.35	@6.30	@6.15
14	18⅛	18¼				6.25	6.10
	@18¾	@18⅜	8 0	36¾	5.35	@6.30	@6.15

London quotations are per long ton (2,240 lb.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars. The price of cathodes is usually 0.125c. below that of electrolytic. The lead prices are those quoted by the American Smelting & Refining Co. for near-by shipments of desilverized lead in 50-ton lots, or larger orders. The quotations in spelter are for ordinary western brands; special brands command a premium.

Formal protest has been made against the recent order of the Treasury Department in relation to the tariff on zinc ores. This is preliminary to bringing the question into court on a test case, which will be made up.

A correspondent informs us that the Russian Government has put a duty of 3.75 to 5 rubles per pood on all copper imported into Russia. The higher figure—5 rubles per pood—is equivalent to about 7c. per pound. The duty is intended for revenue; and also, incidentally, to assist the mining industry in the Caucasus.

John R. Stanton, son of the late John Stanton, the copper authority, states that there will be no change in the selling agency of the various copper companies the output of which has been sold through his firm. The business will be conducted the same as in the past.

Copper—The market has continued fairly active, but the orders placed have been mostly for domestic consumption, foreign buyers having refrained from doing business here as a result of their ability to buy copper for shipment from China at values below those ruling here. Quotations at the close are for Lake, 18½@18¾; electrolytic, in ingots, cakes and wirebars, 18¼@18½; casting copper, 18@18¼c.

The speculative market in London held very firm on account of the covering of shorts. Fluctuations were insignificant,

and the market closed at £80 for spot, £78 1s. 3d. for three months.

Refined and manufactured sorts we quote: English tough, £85@£86; best selected, £86@£87; strong sheets, £91.

Exports of copper from New York for the week were 1913 long tons. Our special correspondent reports the exports from Baltimore at 75 long tons of fine copper.

Tin—While toward the end of last week the tone of the market became somewhat easier, large orders which were placed the beginning of this week created a very much firmer tendency, both here and in London. Quotations here at the close are 36.50@36.75, depending upon deliveries, and in London £166 15s. for spot, £165 7s. 6d. for three months.

Lead—Quotations still remain unchanged and business is exceedingly quiet.

The London market has become somewhat firmer, mainly on account of the fire at the Broken Hill mines, which has resulted in a stoppage of their operations. Quotations at the close are cabled as £16 2s. 6d. for Spanish lead, £16 5s. for English lead.

St Louis Lead Market—The John Wahl Commission Company reports on March 10 as follows; Receipts amounted to 36,960 pigs this week, against 51,090 pigs last week; Shipments 28,320 pigs this week against 27,900 pigs last week. Market ruled firm and unchanged throughout, with an improved demand. About 500 tons reported sold during week at 5.27½c.

The company telegraphs us on March 14 as follows: Lead is firm at 5.27½c. for both prompt and forward delivery. Demand is fairly active.

Spanish Lead Market—Messrs. Barrington & Holt report under date of Feb. 17 that silver has been 14.25 reales per ounce. Exchange is 29.56 pesetas to £1. Local price for pig lead is 78.75 reales per quintal; equal, on current exchange, to £14 16s. 7d. per long ton, f.o.b. Cartagena. Shipments for the week were 552 tons argentiferous lead to Marseilles, and 1006 tons to London.

Spelter—The tone of the market has become somewhat softer, caused by the reluctance of consumers to cover their future requirements. The stocks of spelter, however, are very small, so that a material decline in prices can hardly be looked for. The market closes at 6.10 @6.15 St. Louis, 6.25@6.30 New York.

The London market, which toward the end of last week was extremely weak, is steadying itself a little, quotations having risen from £24 to £24 10d. for good ordinaries, and to £24 15s. for specials.

St. Louis Spelter Market—The John Wahl Commission Company on March 10 reports as follows: Receipts 112,860 slabs this week, against 56,690 slabs last week; shipments 86,350 slabs this, against 144,930 last week. Active and higher; advancing and tending upward from Monday to Thursday inclusive, with sales in the meantime of about 1350 tons for prompt and future delivery at 6.05@6.10c. up to 6.15 and 6.20, with one lot of 500 tons understood to have been at over 6.20c.

The company telegraphs us on March 14 as follows: Spelter is strong but rather quiet. Latest sales have been on a basis of 6.15@6.20c., according to brand and delivery.

Spanish Zinc Ore Market—Messrs. Barrington & Holt report from Cartagena, Spain, under date of Feb. 24, that prices are nominally unchanged at 95 fr. for calamine, 30 per cent. zinc. The market is quiet. Shipments for the week were 650 tons blende to Antwerp.

Silesian Spelter Market—The fall in prices which occurred in January continued through February, owing to the unusually large offerings of second hands. The smelters are busy filling old orders and have not yet felt the decline. Second hands sell at 25¾@26 marks per 50 kg. (5.1@5.2c. per lb.), f.o.b. Breslau. Zinc sheets have been reduced by 2 marks per 100 kg. in view of the falling price of spelter; the base price is now 58@58 1/5 marks per 100 kg. (6.3@6.4c. per lb.). Zinc dust shows no fluctuation at the fall of spelter prices. The quotation on lots of 10 tons is 48 marks per 100 kg. (5.2c. per lb.), f.o.b Stettin.

Zinc Sheets—The price of zinc sheets is $7.75 per 100 lb. (less discount of 8 per cent.) f.o.b. cars for Lasalle and Peru, in 600 lb. cases for gages No. 9 to 22, both inclusive, widths from 32 to 60 in., both inclusive, and lengths from 84 to 96 in., both inclusive. The freight rate to New York is 27.5c. per 100 lb. The fluctuations in the base price for sheet zinc since January 1, 1906, have been as follows: Jan. 6, 1906, $8; Feb. 5, $7.75.

Antimony—The market is very much firmer, English sellers having put up the price £3. Quotations are 17@18c. for Cookson's; 16½@17c. for Hallett's, and 16@16½ for other brands; all for prompt delivery.

Nickel—Quotations for large lots, New York, or other parallel delivery, are 40@47c. per lb., according to size and condition of order. For small quantities, prices range from 48 up to 60c., also according to size of order and deliveries.

Platinum—Prices are still unsettled, the supply being irregular and the demand large. The current price is $25 per ounce, but changes are likely to occur at any time.

Quicksilver—The metal is firm and New York prices are still $41 per flask of 75 lb. for lots of 100 flasks or over, and $42 for small lots down to 10 flasks. For retail quantities, under 10 flasks, pound prices are charged, which work out to $43.50@44 per flask. San Francisco prices are firm at $39.50 for domestic orders and $38 for export. The London price is £7 7s. 6d. per flask, but jobbers ask £7 10s. for moderate lots.

Manganese Alloys—Prices for these alloys in Germany are given by Paul Speier as below. The prices are for orders of not less than 50 kg. delivered in Bremen, and are as follows, per 100 kilograms:

	Marks.
Manganese copper, No. 1, 30% Mn	275
No. 2, 28% Mn	180
No. 3, 20 to 25%, with 2 to 4% iron	165
Manganese tin, No. 1, 55% Mn., no iron	480
No. 2, 56% Mn., some iron	280
Manganese nickel, No. 1, free from iron	450
No. 2, traces of iron	270

Manganese metal is quoted at 3 marks per kg.—38.8c. per lb.—delivered in Bremen. These alloys are made by the Isabellenhütte, in Bonn, Germany, which is represented by Mr. Speier in Breslau as selling agent.

Minor Metals—For minor metals and their alloys, wholesale prices are f.o.b. works:

Aluminum.	Per lb.
No. 1, 99% ingots	35@38c.
No. 2, 90% ingots	33@35c.
Rolled sheets	44c. up.
Aluminum casting alloys	30@38c.
Aluminum-bronze powder	90@$1.00
Bismuth	$2.10
Cadmium, 99.5% f. o. b. Hamburg	92c.
Chromium, pure (N. Y.)	80c.
Copper, red oxide	50c.
Ferro-Molybdenum (50%)	95c.
Ferro-Titanium (20@25% N. Y.)	75c.
Ferro-Chrom. (75%)	12½c.
Ferro-Tungsten (37%)	29c.
Magnesium, pure (N. Y.)	$1.60
Manganese (98@98% N. Y.)	75c.
Manganese Cu. (30@70% N. Y.)	40c.
Molybdenum (98@99% N. Y.)	$1.75
Tantalic acid (N. Y.) (oz.)	49c.
Phosphorus, foreign red	75c.
Phosphorus, American yellow	50c.
Tungsten (best), pound lots	90c.

Variations in price are chiefly due to size and conditions of order and deliveries. Our correspondents report that cadmium is in strong demand, and prices are advancing. The present quotation is 850 marks per 100 kg., f.o.b. Hamburg, Germany. This is equal to 92c. per pound.

Missouri Ore Market.

JOPLIN, March 10.

The highest price paid for zinc ore was $50 per ton, the assay basis price ranging from $44 to $46 per ton of 60 per cent. zinc. This is a decrease of $1 per ton each of four consecutive weeks, and represents a loss to the producers of approximately $60,000, instead of the increase anticipated from the recent ruling of the Secretary of the Treasury on the importation of zinc sulphides and carbonates. Average price $43.56.

The highest price paid for lead was $76.50, an advance of $3.50 per ton over the high price of a week ago, and $19.50 higher than a year ago. All buyers advanced prices, but the St. Louis Smelting and Refining Company and the Picher Lead Company took the bulk of the product, the former company securing the ores bringing the highest price. Average price $71.46.

The total values of the zinc and lead shipment for the ten weeks of the year indicate an increase for the year of approximately two million dollars. The shipments

are 9126 tons of zinc and 2936 tons of lead larger than ten weeks of last year, and the value is $439,970 greater.

Following are the shipments of zinc and lead from the various camps of the district for the week, and the district totals for the week and the ten weeks ending today:

	Zinc, lb.	Lead, lb.	Value.
Carterville-Webb City..	2,886,170	1,056,300	$101,520
Joplin	3,165,280	269,330	80,910
Galena-Empire	839,410	117,040	25,010
Duenweg	764,290	211,100	24,410
Aurora	849,180	.....	13,550
Oronogo	562,660	.....	12,710
Neck City	452,230	27,640	11,390
Granby	550,000	35 000	9,820
Badger	374,630	2,880	8,520
Alba	349 890	.....	8,040
Prosperity	270,810	19,970	7,480
Baxter Springs	280,380	.....	7,000
Spurgeon	246 760	57 180	5,950
Sherwood	131,690	.....	2,960
Stott City	104,360	.. ..	2,340
Carthage	71,510	.....	1,640
Zincite	62 340	.....	1,430
Central City	51 200	2,930	1,390
Totals	12,012 790	1,799,370	$326,070
Ten weeks, 1906	98,594,820	15,125,120	$2,763,205
Zinc value, the week, $261,765; 10 weeks, $2,242,990. Lead value, the week, 64,305; 10 weeks, 520,215.			
Year ago	10,445,710	1.406,270	$ 291,045
Ten weeks, 1905	80,341,620	9,253 960	2,323,235

The following table shows the average monthly prices of zinc and lead ores in Joplin, by months:

ZINC ORE AT JOPLIN.			LEAD ORE AT JOPLIN.		
Month.	1905.	1906.	Month.	1905.	1906.
January	52.00	47.38	January	61 50	75.20
February	52.77	47.37	February	57.62	72 83
March	47.40	....	March	57.20	....
April	42.88	....	April	58.00	....
May	43.31	....	May	58.27	....
June	40.75	....	June	57.86	....
July	43.00	....	July	58.00	..
August	48.83	....	August	58.00	....
September	46.75	....	September	63.50	....
October	47.60	....	October	63.86	....
November	49.55	....	November	68.67	....
December	49.00	....	December	76.25	....

Wisconsin Ore Market.

PLATTEVILLE, March 10.

The zinc-ore market opened with a $1 advance for 60 per cent. ore over last week's prices, on account of a reported scarcity of ore. Owing to the frightful condition of the roads some of the mills were compelled to shut down, as no coal could be hauled out. The ruling price of 60 per cent. zinc ore was $48, ranging from that on down to $28 for the lower grades. One choice lot of roasted ore was reported as being sold at $50.

Lead continues short with a consequent high price being offered, viz.: $38 per thousand. The lead that was loaded had been sold several weeks ago, but was not hauled to the shipping point until this week. Sulphur ore is selling at $4 and $6 per ton.

The Mineral Point Zinc Company has a new buyer in the field who promises some startling changes in the prices of lower-grade ore, favorable to the producer. It is reported that the Joplin Separating Company will start up its custom magnetic separator in the near future.

The camps of the Platteville Zinc and Lead district report ore loaded as follows:

Camps.	Zinc, Lb.	Lead, Lb.	Sulphur, Lb.
Platteville	399 400	.....	... .
Buncombe-Hazel Green	293,800	.....	.....
Linden	241,570	.....	.....
Highland	193,420	....	.....
Mineral Point	72,600	. ...	.....
Livingston	10,000	.....	.....
Elizabeth	.....	150,000	.....
Montfort	.....	.....	56,000
Total	1,260,790	150,000	56,000
Year to Mar. 10	14.402,980	657,770	1,913,040

Mining Stocks.

New York. March 14.

The stock markets continue to fluctuate, without important changes. Possibly there has been more inside operation, with less general buying than recently. At the close matters are rather dull.

On the Exchange, Amalgamated Copper closes at $108½. American Smelting and Refining finishes at $124½ for the preferred and $161 for the common; Federal Mining and Smelting at $104 for the preferred and $180 for the common. There was one sale of Homestake at $83. The industrials were rather quiet.

On the curb the copper stocks were much in evidence. Nevada Consolidated was active, selling up to $19½. Butte Coalition sold at $36½ "when issued." United Copper common was quoted at $32, and Tintic Mining at $9 per share.

On the Consolidated Exchange the Comstocks were dull, but a little more was done in the Tonopahs. . In the Colorado stocks Portland sold at $1.85. There were sales of Jack Pot at 7c. and Little Chief at 9c. Of other stocks, the chief transactions were in Alice at $4 per share.

Boston. March 13.

Quite an improvement is to be noted in the mining-share market for the last week, and sentiment is much more optimistic than it was. It seems quite likely that there will be the usual spring boom in copper shares as the foundation is substantial and seems bound to remain so, judging from the firmness of the metal market. It would also seem as if there might be created a larger interest in Boston coppers, if present plans are followed out. A movement is on foot to place 50 Boston tickers in New York brokerage offices, and this ought to add to the already large following in copper from that center.

United Copper shows the largest advance during the week, going up over $10 to $73. North Butte has also been strong, rising over $5 to $84.75 ex-dividend. A sudden spurt in Osceola and Wolverine last Saturday has imparted a good tone to the better class of Lake mines. The former is up $8 to $102, and Wolverine spurted $12.50 to $151, losing $7 of it.

Boston Consolidated was freely sold today, and broke $3.37½ to $23.75, with $1 recovery. A hitch in the negotiations to consolidate this with the Utah Copper Company was given as the cause, Newhouse holding that the two should go in on the same basis of exchange for the new company's stock. Conspicuous has been the steady advance in Nevada Consolidated. During the week it has advanced $2.62½ to $19.50. The buying is said to be the American-Smelting people, who are said already to be in control. Victoria spurted $1.75 to $9, on announcement that the new air compressor is working all right, and will soon bring the mine to the productive stage. Franklin continues in fair request, and the stock is selling above $20. Isle Royale rose $2.75 to $24.75, but did not hold it. Any attempt to put this stock up seems to meet with opposition. Utah Consolidated closes $1.25 higher at $62.25, and United States Smelting $2.50 higher at $55.75. The latter company is earning about $300,000 net per month. Allouez closes $2.50 higher at $39, yet the market fluctuates widely on small dealings. The annual report issued today, shows receipts from the sale of 1,167,957 lb. of copper with the use of one stamp head half time from Aug. 1 to Jan. 1 to have been $194,719. Expenses were $118,714 and construction amounted to $35,518. Shannon spurted almost $1 today to $7.37½, and old Washington sold up to $2. Greene Consolidated has been the active stock on the curb, and has fared better than when listed. It is up $2.50 to $30. It is understood that Greene will be put back on the exchange. Butte Coalition has advanced $4 to $37. This stock will probably be listed on the exchange in the near future. It is now said that the delay in the floatation of the American Consolidated Copper Company is the desire to await the psychological moment.

Colorado Springs. March 9.

The stock market has been quite active during the past week, but with slightly lower prices. As a rule, El Paso has shown more strength than any other stock, advancing from 73 to 93½c.; Isabella has also made a gain, advancing 2½c. and selling today for 29c. The majority of stocks show declines. Anaconda lowered a fraction and was traded in today at 14c. Portland lost 4c. on a market of $1.80. This is also true of Vindicator, selling for 90c. Findley has held its own and is selling for 74c. Elkton is selling for 40c. today.

San Francisco. March 8.

The Comstocks have been rather dull and heavy, with small fluctuations, chiefly in a downward direction. Ophir sold at $5.50; Consolidated California & Virginia, $1.25; Mexican, $1.20; Hale & Norcross, $1.15. It was chiefly a chippers' market.

The Tonopah and Goldfield stocks were in strong demand, with the market almost excited, and many fluctuations. Montana

Tonopah sold up to $2.85; West End, $2.65; Midway, $2.25; Jim Butler, $1.55; Sandstorm, $1.45; McNamara, 66c. Many new stocks are being brought out.

Oil stocks have been quiet, with few changes.

Dividends.

Company.	Payable.	Rate.	Amt.
Am. Smelting & Ref.	Apr. 16	$1.75	$875,000
Am. Smelting & Ref., pfd.	Apr. 2	1.75	875,000
Calumet & Arizona	Mch. 20	2.50	500,000
Calumet & Hecla	Mch. 23	15 00	1,500,000
Con. Mercur	Mch. 26	0 02½	25,000
Copper Range Con	Mar. 31	1.25	.....
General Chemical, pfd	Apr. 2	1.50	150,000
Homestake, S. D. & R.	Mar. 26	0.50	109,200
Iron Silver	Apr. 2	0.20	100,000
Teziutlan Copper	Apr. 2	2.00	160,000

*Monthly. §Bi-monthly. †Quarterly. ‡Semi-Annually.

Assessments.

Company.	Delinq.	Sale.	Amt.
Andes	Mar. 9	Mar. 30	$0.10
Bullion Con., Cal.	Mch. 19	.....	0.06
Champion Mines, Cal.	Mar. 17	.....	0.50
Christmas, Utah	Apr. 16	May 5	0.00½
Hale & Norcross	Mar. 2	Mar. 27	0.10
Justice	Feb. 27	Mar. 19	0.05
Lower Mammoth, Utah	Mar. 19	Apr. 9	....
New Red Wing, Utah	Mch. 17	Apr. 7	0.02
Pioneer, Utah	Mch. 15	Apr. 7	0.01
Pinos Altos, N. M	Mar. 26	.....	1.00
Savage, Nev.	Mch. 14	Apr. 3	0.10
Wabash, Utah	Mch. 15	Apr. 4	0.10

Tonopah Stocks. Mar. 14.

(Revised by Weir Bros. & Co., New York.)

	High.	Low.	Last.
Tonopah Mine of Nevada	19.50	19.00	19.25
Tonopah Montana	3.15	3.05	3.10
Tonopah Extension	13.12	12.50	12.75
Tonopah Midway	2.50	2.40	2.45
Tonopah West End	2.25	2.70	2.70
Goldfield Mining Co.	.66	.63	.64
Jumbo Mining	1.55	1.50	1.50
Red Top	2.00	1.90	1.95
Sandstorm	1.48	1.40	1.45
Montgomery Shoshone Cons.	20.05	19.75	20.00
Eclipse-Bullfrog	.96	.93	.95
Denver-Bullfrog	1.65	1.50	1.55

St. Louis. Mar. 10.

	High.	Low.
Adams	$ .40	$ .30
American Nettie	.18	.12
Center Creek	2.60	2.40
Central Coal & Coke	61.50	60.00
" " " pfd.	80.00	79.00
Central Oil	60.00	55.00
Columbia	2.00	1.00
Con. Coal	25.00	22.00
Doe Run (old stock)	400.00	300.00
Granite Bimetallic	.30	.17
St. Joe (old stock)	35.00	31.00

LONDON. (*By Cable.**) Mar. 14.

	£	s.	d.
Dolores	1	17	6
Stratton's Independence	0	7	3
Camp Bird	1	8	6
Esperanza	4	7	6
Tomboy	1	8	9
El Oro	1	10	0
Oroville	0	19	0
Arizona Copper, pf.	3	6	6
Arizona Copper, def.	3	6	3

*Furnished by C. Schumacher & Co., New York.

PHILADELPHIA.

Cambria Steel	36⅜	34	35½	11,306
Philadelphia Co.	51	50¾	51	1,327
Tonopah	19¾	18¾	18¾	3,588

PITTSBURG.

Crucible Steel	15⅜	14¼	14⅞	7,023
Crucible Steel, Pref.	81	77½	79¾	8,358
Tonopah Ext.	13¾	10	13	15,230

STOCK QUOTATIONS.

NEW YORK. Week Mar. 13.

Name of Company.	High	Low	Clg.	Sales
Amalgamated	108⅝	102⅛	106⅛	635,610
Anaconda	276¼	254½	265	286,200
Boston Copper	28⅜	26¾	23¾	33,300
British Col. Copper	9	8⅛	8⅛	11,665
Federal	180	171	180	400
Federal, Pf.	104¼	101¾	103⅞	4,411
Greene Copper	30	27⅞	29⅛	47,800
Greene Gold	3¾	2⅞	3½	17,340
Homestake	83	82	83	330
Mitchell	13	11¾	12¼	7,846
Tennessee Copper	45	41½	44¾	3,950
Union Copper	1⅞	1⅝	1¾	8,800
United Copper	72⅞	58	69¾	193,500
United Copper, Pref.	105	100	100	10
Utah Apex	7¼	5⅛	7	15,600
Utah Copper	33⅞	31	32	4,450

NEW YORK INDUSTRIALS.

Am. Smelting & Ref.	162½	153¾	159⅝	208,000
Am. Smelting & Ref., Pf.	124⅝	121¼	124	4,221
Col. Fuel & Iron	66¼	58½	63⅜	191,060
National Lead	86	76	84	62,850
Pittsburg Coal				
Pittsburg Coal, pf.	56	54	54	200
Republic I. & S.	31	28⅝	29⅜	6,100
Republic I. & S., Pf.	105⅛	102¾	104¼	4,100
Tenn. C. & I.	152⅞	148	151⅛	1,600
U. S. Red. & Ref.	26¾	25	26¼	800
U. S. Red. & Ref., Pf.	66	64	65¾	1,900
U. S. Steel	41¾	39¾	40⅞	309,360
U. S. Steel, Pf	107	104½	105	86,282
Standard Oil	670	660	665	163
Bethlehem Steel	29¼	26	26	1,050

These stocks, not elsewhere quoted, had the following range of prices during the week: (New York) Bamb. Delamar, 7½—6; Butte Coalition, 40—31; Cumb.Ely Min., 8¼—5¾; Greene Gold-Silver, 4¼—3½; Mont. Shoshone, 5¼—4¼; Mont. Shoshone, new, 19¾—18¼; Nevada Con. Copper, 19¾—16. (Boston) Adventure, 6¾—5½; Montana C. & C., 5½—4¼; Nevada, 19½—16¼; Trinity, 11¾—9¾; U. S. Oil, 12¼—12⅛.

BOSTON.

Allouez	39	36½	37½	1,685
Amalgamated	108⅝	102¼	106⅝	47,256
Atlantic	24	23	23	730
Bingham	41⅝	38	39⅛	16,140
Boston Consolidated	28⅛	23⅞	23⅞	20,794
*Calumet & Hecla	690	685	685	90
Centennial	27	23⅛	25¼	9,086
*Mercur	68	64	68	1,235
*Copper Range	80⅛	78⅜	79⅛	5,694
*Daly-West	15⅞	14⅜	15	2,131
Franklin	20¼	19⅛	19⅝	9,571
Granby	13⅜	11½	12⅞	11,403
Green Con. Copper				
Isle Royale	24¾	21	22	7,900
Mass	9⅛	9	9	1,075
Michigan	13¾	13	13½	1,010
Mohawk	58	56	57¾	1,171
North Butte	84¾	80¼	82¼	11,100
Old Dominion	46⅞	44½	45¾	2,905
Osceola	102	93	99	3,315
*Parrot	39½	35¾	38	2,965
Quincy	91	87	90	522
Rhode Island	6¼	5	6⅛	2,216
Shannon	6⅛	5¾	6⅛	6,274
Tamarack	108	107	107	344
Tecumseh	13⅛	12¾	13⅛	865
United Copper, com.	73	62⅞	69¾	27,725
U. S. Smg. & Ref.	56	53	55	6,631
" " pfd.	45	44¼	44⅝	6,088
Utah	63	61⅛	61½	3,726
Victoria	9	7⅞	8⅛	5,249
Winona	8½	7	8⅛	1,170

COLORADO SPRINGS.

Name of Company.	First	High	Low	Clg.
Elkton	43	43	38	39
El Paso	77	94	75	87
Isabella	27½	28½	26¼	26¼
Portland	185	187	180	182
Vindicator	94	95	90	90

SAN FRANCISCO.

Best & Belcher	1.05	1.10	.90	1.10
Bullion	.30	.32	.25	.32
Caledonia	.42	.45	.40	.45
Confidence	.70	.72	.67	.72
Con. Cal. & Va.	1.20	1.35	1.15	1.35
Gould & Curry	.12	.12	.08	.12
Hale & Norcross	1.00	1.45	1.00	1.45
Mexican	1.20	1.25	1.10	1.25
Occidental Con	.90	.99	.89	.94
Ophir	5.50	5.37½	5.00	5.37½
Savage	.42	.62	.38	.62

*Ex-dividend. †1st Installment Paid.
‡Assessment Paid. §2d Installment Paid.

Monthly Average Prices of Metals.

SILVER.

Month.	New York.		London.	
	1905.	1906.	1905.	1906.
January	60.690	65.288	27.930	30.113
February	61.023	66.108	28.047	30.464
March	58.046	.....	26.794	.....
April	56.600	.....	26.108	.....
May	57.832	.....	26.664	.....
June	58.428	.....	26.910	.....
July	58.915	.....	27.163	.....
August	60.259	.....	27.822	.....
September	61.695	.....	28.528	.....
October	62.034	.....	28.637	.....
November	63.849	.....	29.493	.....
December	64.850	.....	29.977	.....
Year	60.352	.....	27.839	.....

The New York prices are in cents per fine ounce; the London quotation is in pence per standard ounce, .925 fine.

COPPER.

Month.	NEW YORK. Electrolytic.		NEW YORK. Lake.		LONDON.	
	1905.	1906.	1905.	1906.	1905.	1906.
Jan.	15.008	18.310	15.128	18.416	68.262	78.896
Feb.	15.011	17.869	15.136	18.116	67.963	78.147
March	15.125	.....	15.250	.....	68.174	.....
April	14.920	.....	15.045	.....	67.017	.....
May	14.627	.....	14.820	.....	64.875	.....
June	14.673	.....	14.813	.....	65.881	.....
July	14.888	.....	15.005	.....	66.887	.....
Aug.	15.664	.....	15.725	.....	69.830	.....
Sept.	15.965	.....	15.978	.....	69.667	.....
Oct.	16.279	.....	16.332	.....	71.406	.....
Nov.	16.599	.....	16.758	.....	74.727	.....
Dec.	18.328	.....	18.398	.....	78.993	.....
Year.	15.590	.....	15.699	.....	69.465	.....

New York prices are in cents per pound. Electrolytic quotations are for cakes, ingots or wire bars. The London prices are in pounds sterling, per long ton of 2,240 lb., standard copper.

TIN IN NEW YORK.

Month.	1905.	1906.	Month.	1905.	1906.
Jan.	29.325	36.390	July	31.760	....
Feb.	29.262	36.403	August	32.866	.....
March	29.523	.....	Sept	32.095	.....
April	30.525	.....	Oct	32.481	.....
May	30.049	.....	Nov	33.443	.....
June	30.329	.....	Dec	35.836	.....
			Av. year.	31.358	.....

Prices are in cents per pound.

LEAD IN NEW YORK.

Month.	1905.	1906.	Month.	1905.	1906.
Jan.	4.552	5.600	July	4.524	.....
Feb.	4.450	5.464	Aug.	4.665	.....
March	4.470	.....	Sept.	4.850	.....
April	4.500	.....	Oct.	4.850	.....
May	4.500	.....	Nov.	5.200	.....
June	4.500	.....	Dec.	5.422	.....
			Av., year.	4.707	.....

Prices are in cents per pound. The London average for January, 1906, was £16.850 per long ton; February, £16.031.

SPELTER.

Month.	New York.		St. Louis.		London.	
	1905.	1906.	1905.	1906.	1905.	1906.
Jan.	6.190	6.487	6.032	6.337	25.062	28.225
Feb.	6.139	6.075	5.989	5.924	24.594	25.844
Mar.	6.067	.....	5.917	.....	23.825	.....
April	5.817	.....	5.667	.....	23.813	.....
May	5.434	.....	5.284	.....	23.594	.....
June	5.190	.....	5.040	.....	23.875	.....
July	5.396	.....	5.247	.....	23.938	.....
Aug.	5.706	.....	5.556	.....	24.675	.....
Sept.	5.887	.....	5.737	.....	26.375	.....
Oct.	6.087	.....	5.934	.....	28.225	.....
Nov.	6.145	.....	5.984	.....	28.500	.....
Dec.	6.522	.....	6.374	.....	28.719	.....
Year.	5.882	.....	5.730	.....	25.433	.....

New York and St. Louis prices are in cents per pound. The London prices are in pounds sterling per long ton (2,240 lb.) good ordinary brands.